



The U.S. Army Energy and Water Campaign Plan for Installations



Fiscal Year 2008 - Fiscal Year 2013

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**Army Energy and Water
Campaign Plan for Installations**

Fiscal Year 2008 to Fiscal Year 2013



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Tab Number 1

Introduction



Army Energy and Water Campaign Plan for Installations

Introduction

The Army Energy and Water Campaign Plan for Installations (Campaign Plan) will ensure that the Army provides safe, secure, reliable, environmentally compliant, and cost-effective energy and water services to Soldiers, their families, civilians, and contractors on Army installations. The Campaign Plan has been developed to implement the Army Energy Strategy for Installations (Energy Strategy) and sets forth the Army's energy goals for the next 25 years. The Campaign Plan defines the actions, the short-term, mid-term, and long-term approaches, and the tools, technologies and projects required to ensure the Army successfully achieves long-range energy and water goals and arrives at the preferred end state.

The Energy Strategy sets the general direction for the Army with five major initiatives that are supported by specific objectives. These initiatives are—

- **Eliminate energy waste in existing facilities**—Eliminate and reduce energy inefficiencies that waste natural and financial resources, and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians, and contractors work and live.
- **Increase energy efficiency in new construction and renovations**—Increase the use of energy technologies that provide the greatest cost-effective energy efficiency, and support environmental considerations.
- **Reduce dependence on fossil fuels**—Increase the use of clean, renewable energy, and improve efficiency of existing energy systems to reduce dependency on fossil fuels and to optimize environmental benefits and sustainability.
- **Conserve water resources**—Reduce water use to conserve water resources for drinking and domestic purposes.
- **Improve energy security**—Provide for the security and reliability of energy and water systems in order to provide dependable utility services.

The Campaign Plan is a living document that will be regularly updated. It provides a detailed road map for achieving the five initiatives of the Energy Strategy. The Campaign Plan implements the strategic vision and delivers the desired outcomes by coordinating management and technical support requirements; identifying specific action items, policies, projects, and programs to achieve the initiatives; and maintaining suitable oversight, evaluation, and program adjustment. The Campaign Plan—

- Provides the Army's Way Ahead by identifying specific actions and milestones, and funding strategies to meet the energy and water conservation goals of the Energy Policy Act (EPAct) of 2005 and other applicable policies and regulations.
- Identifies management and institutional requirements to achieve actions.
- Identifies funding strategies and resources.
- Describes the desired end state for the actions and identifies the metrics of success.
- Provides a year-by-year investment plan that coordinates all Army energy/water users and policy components (security, privatization, procurement, technology, construction, and environment) into cohesive and measurable objectives designed to meet the goals.

Background

The Army operates in a domestic and world energy situation that is highly uncertain. To chart an effective and viable path for its energy and water future, the Army must immediately begin to consider the short term and long-term issues involved in developing enduring energy policies and solutions for its installations. To sustain its mission and ensure its capability to project and support the forces, the Army must anticipate, plan, and mitigate the economic and logistical energy- and water-related problems coming in the near future. This requires a transition to modern, secure, and efficient energy and

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water systems; improved management practices; and high-efficiency facilities and technologies that are environmentally friendly. These supply- and demand-side challenges require thoughtful planning and execution using integrated solutions.

Vision

The Army Energy Strategy and Campaign Plan envisions secure, efficient, reliable, sustainable, and cost-effective energy and water services for installation while striving to maintain reciprocally beneficial partnerships with surrounding communities. The Campaign Plan looks out to the year 2030 to envision conditions of domestic and imported energy resources and the evolution of the energy marketplace.

Development of new technologies and increased efficiencies will decrease the energy intensity of global industrialization while increased demand may surmount these efficiency improvements resulting in greater competition for energy resources with associated energy price increases and shortages. Environmental considerations, technology gaps, construction backlogs, political unrest, and depleted supplies will play a larger role in the energy industry's ability to provide reliable and economic energy resources.

Domestically, the challenges of maintaining and operating the two seamless energy grids (natural gas and electricity) that form the bedrock of our national energy system with appropriate control and adequate infrastructure may result in supply problems at some locations. Continuing pressure to reduce operating costs and space constraints from increasing population may result in more compact installations and higher energy densities but with reduced expense for energy distribution between facilities. All of these considerations point to the need for greatly increased energy efficiency, load management, and alternative sources of energy.

The Army as a whole will execute its energy and water management activities with more coordinated planning and organization to produce the required outcomes with existing resources. We will work smarter and leverage off our collective talents with expanded collaboration. Our committed enthusiastic leadership will continue to provide dedication and follow through. Our greater willingness to share ideas and risks, and change operations for increased agility and effectiveness will carry us far. We will carry on our tradition of being dedicated, disciplined, informed and active.

Energy and Water Resources

The primary issues affecting energy-and to a certain extent water supply-options are those of availability, affordability, sustainability, and security. Since energy and water resources are unevenly distributed around the world, and the impacts of energy consumption have global reach in both environmental and political terms.

Availability. Future availability of customary energy sources is uncertain. United States production of both oil and natural gas are past their peak, and world petroleum production is nearing its peak. Growing domestic consumption will continue to increase dependence on foreign (potentially unstable) energy sources. Almost half of the existing domestic natural gas reserves are considered to be stranded – they are too remote, located on restricted Federal lands, or considered too environmentally detrimental to harvest. Construction of an Alaskan natural gas pipeline and the importation of Liquefied Natural Gas (LNG) are possible solutions to domestic natural gas problems.

Water scarcity may be the most underestimated resource issue. World water use has tripled in the past 50 years. Forty percent of our food supply now comes from irrigated lands, showing increased reliance on irrigation in the world food economy. While the demand continues to rise, the basis amount of fresh water supply provided by the hydrological cycle remains static.

Affordability. As demand for natural gas and petroleum exceeds supply on a national or worldwide basis, prices rise. As population increases and as standards of living are improved for the developing world, competition for finite resources will increase.

Water remains a very affordable commodity to most citizens—especially for non-irrigation needs. However, in many areas of the country, water (and wastewater treatment) rates are rising faster than energy. This is particularly true in the arid west and in parts of the east coast. On the other hand, in many parts of the country with abundant water supply and at many

Army installations, water is undervalued and thus a very low cost commodity. With low costs, the tendency is to not use the water wisely and most efficiently.

Sustainability. Worldwide consumption of fossil fuels continues to grow. Fuel combustion affects the global climate with the production of greenhouse gases and localized production of acid rain, low lying ozone, and smog. Current energy policies and consumption practices are not sustainable; they clearly limit and potentially eliminate options for future generations.

With worldwide water tables falling (particularly in the Western United States), a static hydrologic cycle supplying water, increased population, and increased demand for the water, the current rate of use of water cannot be sustained. More efficient use and re-use are the only answers to this dilemma and to mitigate a pending crisis.

Security. In an age of terrorism, combustible and explosive fuels and potential weapons-grade nuclear materials create security risks. Under the current energy and water supply infrastructure, there is also considerable vulnerability to the disruption to Army installations.

Water system supply security is as important as energy security in order to maintain functioning installations.

Energy Trends

Energy consumption in Army facilities consists of approximately one-third electrical energy with the remainder being thermal energy supplied primarily by natural gas and fuel oil. The energy efficiency associated with the Army facilities and mobility is expected to gradually improve, but overall consumption may potentially increase depending on future phases of the global war on terror and on geopolitical tensions resulting from the world energy situation.

Table 1 summarizes the current demand, supply, and proportionate distribution of energy on a global, national, and Army basis. Army totals include OCONUS energy use. Table 2 lists world reserves. Currently, the United States imports 26% of its total energy supply and 56% of its oil supply. The Army and the nation's heavy use of oil and natural gas are not in alignment with either the nation's or the earth's resources and upcoming availability. The relative fuel shares of energy use versus energy reserves underscore our need to supplement oil and natural gas as our staple fuels. The nation's supply and demand imbalance would lessen if coal and/or nuclear energy could be made more environmentally acceptable or if the renewable share of our energy portfolio were to vastly increase. Worldwide energy consumption is expected to increase by 2.1%/year; domestic energy consumption by 1.4%/year, exacerbating global energy competition.

Table 1. Summary of Army, United States, and World Energy Consumption.

	Oil	Natural Gas	Coal	Nuclear	Renewable	Electricity	Purchased Steam	Total
Fuel Share of U.S. consumption	40%	23%	23%	8%	6%			100%
U.S. consumption (Q/yr) 2003, EIA	39	23	22	8	6			98
U.S. Imports (Q/yr)	22	4						26
Percent of U.S. consumption imported	56%	17%						27%
World consumption (Q/yr)	147	94	104	24	32			401
U.S. share of world consumption	27%	24%	22%	32%	18%			24%
U.S. Army on-site consumption (TBtu/yr) 2004, including mobility	20	27	7	*	1	30	7	92
On-site Fuel share of Army consumption	22%	30%	7%	0%	1%	33%	7%	100%
U.S. Army consumption primary fuels** (TBtu/yr) 2004	22	40	55	6	4			127
Primary fuel share of Army consumption	18%	31%	43%	5%	3%			100%

* No direct on-site consumption of nuclear fuel

** Includes source energy used to produce electricity and purchased steam

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Table 2. Summary of United States and World Energy Reserves.

	Oil	Natural Gas	Coal	Nuclear	Renewable	Total
U.S. reserves (Q) 2003	132	193	6,678			7,003
Domestic proportion fossil fuel	2%	3%	95%			
World reserves (Q) 2002	6,026	6,317	26,578			38,921
World proportion fossil fuel	16%	16%	68%			

Natural Gas

The natural gas market for the near term is expected to be volatile. Prices will fluctuate significantly based on weather and supply. In the near term, prices will increase continually until the natural gas market is normalized by the constructing a gas pipeline from Alaska and northern Canada, by expanding exploration and production to areas of the United States now off limits, and by greatly increasing imports of liquefied natural gas.

Petroleum

The oil market will remain fairly stable in the very near term, but with steadily increasing prices as world production approaches its peak. The doubling of oil prices from 2003-2005 is not an anomaly, but a picture of the future. Oil production is approaching its peak and very low growth in availability can be expected for the next 5 to 10 years.

Coal

In spite of the large production of air pollutants generated by coal consumption, it is likely that the utility sector and possibly the large industrial sector will continue to use the nation's large supplies of coal. With current technologies, coal combustion remains problematic, but current research shows some promising technological solutions including coal-to-liquids and coal gasification. Deploying poly-generation techniques with carbon sequestration on a large scale may potentially allow the United States to use the nation's coal reserves in an environmentally friendly way to meet both liquid fuel and electricity requirements.

Nuclear Power Trends

Nuclear power appears headed for a small renaissance. Some nuclear plant upgrades are planned in the short term. In the mid term, a modest construction program is getting under way, a new generation reactor is being designed, and some shutdown reactors may be restarted.

Renewable Energy Trends

Renewable energy technologies will certainly be a growing part of the energy mix and will penetrate faster and further as the technologies mature and become more cost-effective.

Electrical System Trends

The electrical system will likely become increasingly problematic over the next 5 to 10 years. Power capacity should suffice and utilities have overbuilt to meet the peaking market. They are also planning additions to base capacity. However, the grid is the weak point in the nation's electrical system and significant investments are required to maintain power flow demands and reduce bottlenecks and increase reliability.

Water Trends

Army water consumption is dominated by facilities consumption. With careful planning and implementation of water conservation and reuse technologies, consumption of potable water in Army facilities will decrease in both total quantity and in intensity basis. The absorption of overseas troops onto domestic installations will make this outcome challenging. There is considerable cost-effective and untapped potential for saving potable water through minimizing wasteful

practices, water conservation and re-use at Army installations. To most effectively implement water conservation practices and water needs to be as highly valued as energy at Army installations.

Implications for Army Installations

Our best options for meeting future energy requirements are energy efficiency and renewable sources. Energy efficiency is the least expensive, most readily available, and environmentally friendly way to stretch our current energy supplies. This ensures that we get the most benefit from every Btu used. It involves optimizing operations and controls to minimize waste and infusing state-of-the-art technology and techniques where appropriate.

Renewable options make use of Earth's resources that are not depleted by our energy consumption practices, namely, solar, wind, geothermal, geoexchange, hydrology, tidal movements, agricultural products, and municipal wastes. These options are available, sustainable, and secure. The affordability of renewable technologies is improving steadily, and with a strong market pull, cost reductions could be dramatic. For both efficiency improvements and renewables, the intangible and hard to quantify benefits—such as reduced pollution and security—yield indisputable economic value.

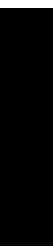
We must act now to develop the technology and infrastructure necessary to transition to other energy sources and conserve water supplies. Policy changes, new and emerging technology, technology breakthroughs, cultural changes, increased use of recycled water, and significant investment in infrastructure and renewable energy sources are requisites for this new energy and water future and are specifically addressed in the Campaign Plan.



Tab Number 2

Initiative Number 1

**Eliminate Energy Waste
In Existing Facilities**



Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians, and contractors work and live.

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Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians, and contractors work and live.

1.1 Action #1: Develop effective national, regional and installation energy management plans

1.1.1 Approaches to meet actions and priorities (S/M/L: short-term of up to two years; mid-term of two to five years; and long-term of more than five years)

Discussion

The management of Army energy and water is a complex process. It requires synthesizing a diverse set of drivers and circumstances into a unified strategy. Changing mandates, technologies, fuel outlooks, and security issues form new challenges that must be addressed. These challenges range from global issues (such as climate change and energy resource availability) to local issues (such as providing energy system security and meeting new energy reduction targets). Careful systematic planning is imperative for success.

This Army level campaign plan organizes and focuses on energy and water management initiatives by responding to Federal legislation, as well as reflecting Department of Defense (DOD) and Department of the Army (DA) requirements, visions and values. The plan is written in light of the present and anticipated world situation and favorably postures us to maintain our utility needs in support of the Army's mission.

Presently, installations independently manage their own energy and water efficiency efforts. They are responsible for identifying, developing, and implementing projects; ensuring that new construction meets sustainable design criteria; and maintaining awareness. Installations often lack sufficient funding to provide for a full-time energy, and resource manager. This may result in hasty and piecemeal projects, inconsistent calculation methods, and lack of awareness of regional activities and opportunities.

There is widespread concern at the installation level that the obvious, quick payback means of increasing efficiency have already been implemented and new efforts are yielding diminishing returns. Further, financial resources are limited, source fuels are increasingly uncertain, and energy reduction and operational requirements are progressively more challenging. Energy managers want and need more help to use limited dollars with as much impact as possible.

The current mode of bottom up, decentralized energy and water management will be augmented with tiered planning efforts. These efforts will ensure installation level circumstances are informed with regional and national perspectives and capabilities. Information and ideas will flow up, down, and across the management structure. This brings together multiple perspectives on a complex program and results in synergies in process and outcomes. This ensures that neither the big picture of national analysis nor the individual circumstances of the installation level are lost. (M)

Goals and targets will be managed collectively such that the Army will meet requirements as an entire unit while not necessarily making the same progress at each installation. Efforts and resources will be concentrated where they make the most sense and yield the greatest returns. Systematic review, feedback, and adjustment of operations will keep efforts on target. (M)

Major Army commands and the Installation Management Agency (IMA) will receive guidance from the Office of the Assistant Chief of Staff for Installations (OACSIM) on appropriate thermal comfort conditions, indoor air quality requirements, energy performance by building function and climate, water consumption standards and common yardstick calculations and procedures. Further, they will be given individualized performance targets, pertinent technology focus and strategic fuel diversity guidelines based on present performance and regional opportunities. These insights will be generated from a centralized review of overall Army energy operations. (M)

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The Army will develop an energy management plan template (format provided on the Army energy program webpage at <http://hqda-energypolicy.pnl.gov/>) that will be used to develop the MACOM/regional level plans. MACOMs/regions will be responsible for development of installation-level targets that will be used for installation-level plans. MACOMs and regions will also track and report progress of programs. (S)

Progress at each level and for individual programs will be reviewed centrally. This review will identify performance issues and corrective actions. Adjustments to refine targets over time are expected, indicating the need for continued effective analytical capabilities, for example, analysis should be linked to knowledge management tools. Over time, targeting tools should be developed to improve Army ability to achieve the greatest progress. (M)

- a. Headquarters, Department of the Army (HQDA) will develop overall national energy management plan. (S)
- b. HQDA will develop a template for Regions to follow in developing the Regional Plans. (S)
- c. Installations will develop installation specific energy management plans that tie into the Regional plans and template provided in Region plan.
- d. Installation energy plan should be reviewed and revised on a periodic basis. (M)

1.1.2 Technologies and Tools Required

Tiered planning efforts will require the development of a long-range energy planning template, an energy performance targeting methodology, and rating and tracking tools. Centralized review of energy stewardship and suggestions for future progress will make use of verified data from the Army Energy and Water Reporting System (AEWRS), commercial building energy consumption survey (CBECS) data energy modeling capabilities, life-cycle costing capabilities, and the Technology Standards Group database and recommendations.

1.1.3 Policies, Management, and Institutional Issues

EPAcT 2005

The EPAct 2005 in Section 102: "Energy Management Requirements" requires:

- a. Annual energy reduction goal (Btu/ft²) of 2%/year from fiscal years (FY) 2006 through FY 2015. The overall goal is a 20% reduction (compared to the FY 2003 baseline) in FY 2015.
- b. Energy reduction reporting baseline changed from FY 1985 to FY 2003.
- c. Reduction goals apply to all buildings including industrial or laboratory facilities.
- d. Retention of appropriated funds for energy, water and wastewater expenditures that were not made because of energy or water savings. Retained funds used for energy efficiency, water conservation or unconventional and renewable energy resources projects.

Management and Institutional Issues

Installations will be required to prepare a long-range energy management plan to meet performance targets per the EPAct 2005 requirements and track progress. Plans will be centrally reviewed, collaboratively updated and revised on at least a three-year cycle.

1.1.4 Specific Projects to Meet Action

Several projects will be required to meet the intent of this action. These include:

- a. A centralized review of overall Army energy operations which will determine the current status of utility consumption, source fuel portfolio, technology profiles and associated environmental impacts and costs. Assessments will be made on an Armywide, MACOM/regional and installation level. MACOM/regional and installation level targets to reach associated Armywide goals will be developed. Trending and targets will be updated annually. (S)
- b. Develop the requirements for the long-range energy management plans. (S)
- c. Long-range energy management plan support to installations will include template development, calculation methods, procedures and trending and tracking tools. (S)
- d. The Army will determine installation level responsible party (by name); prepare and maintain a list at OACSIM as part of the Engineer Data Base in the AEWRS. (S)

A review process will be established to ensure efforts are moving us in the desired direction and regional and collective opportunities are exploited. (M)

1.1.5 Funding Strategies and Sources

Internal actions covered in existing operating budgets. Supplemental funding for developing installation energy management plans.

1.1.6 Description of End State

- a. A centrally funded and managed energy program that addresses the multiple priorities of the Army's missions is the desired end state. Each level of the organization will have specific goals that support the overall energy management goals of the Army.
- b. One hundred percent of installations with completed energy management plans is the desired end result.

1.1.7 Metrics of Success

The measurable metrics of success for this action are 90% of installations will have current long-range plans (updated within the last two years), Armywide energy use index (EUI) that shows reduction from the previous year and the established baseline per the EPAct of 2005 energy reduction requirements, meeting or exceeding the required percentage of renewable energy usage, and meeting or exceeding the required percentage of buildings meeting performance progress toward technology and fuel portfolio goals.

1.1.8 Milestones (actions by FY)

Responsible party list	FY 2006
Develop/distribute policy for energy management plan requirements	FY 2006
Army-wide review with regional and installation level targets	FY 2006
Energy plan template, calculations and procedures	FY 2007
80% of MACOM/regional level plans in place	FY 2007
80% of installation level plans in place	FY 2007
Initial annual review of installation level plans	FY 2008
Meet energy reduction goals of the EPAct of 2005	FY 2006-15
Sites retain funds per the requirements of the EPAct of 2005	FY 2006-25

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.2 Action #2: Provide a full-time, trained, and certified staff to lead the energy and water management program and its initiatives

1.2.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Establish energy management program manpower staffing standards for garrisons, regions, and headquarters to include a baseline staffing level consistent with the size of the installation and annual utility budget. (S)
- b. Establish standardized job descriptions for energy/water managers. (S)
- c. Revise the Standard Garrison Organization (SGO) to establish an office within the Director of Public Works (DPW) or directly under the Garrison Commander, to centralize all energy/water management program manpower resources. This would include the functions of a Energy/Water Program Manager, Utilities Rates Clerk, Utilities Sales Officer, and Engineering Technicians. (S)
- d. Obtain resources for full staffing at all organizational levels. (M)
- e. Increase the use of Resource Efficiency Managers (REMs) to supplement government staffing. (M)
- f. Develop Army-specific energy/water management training (Level 1 training). (S)
- g. Develop Army-specific utilities sales and acquisition training courses (Level 2 training). (S)
- h. Sponsor Certified Energy Manager (CEM) training and certification courses for energy managers (Level 3 training). (S)
- i. Survey available training courses and materials. (S)
- j. Pursue development of higher level technically oriented training courses through the U.S. Army Corps of Engineers Proponent Sponsored Engineer Corps Training Program.
- k. Involve key partner organizations (that is, Department of Energy (DOE), the American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE), national labs, etc.) in development of training levels. (S)
- l. Partner with the DOE Federal Energy Management Program (FEMP) office and other Defense Services to improve and expand application of energy training resources (example Web-based energy savings performance contracting (ESPC) training, and industrial facilities training). (M)

1.2.2 Technologies and Tools Required

- a. Maximize use of web-based training as one way to keep training costs lower.
- b. Classroom instruction where necessary (videoconferencing)
- c. Standard energy auditing test and measurement equipment

1.2.3 Policies, Management, and Institutional Issues

- a. Development of staffing standards will require coordination and approval by Army proponent staff offices.
- b. Development of standardized job descriptions will require coordination and approval by civilian personnel office.
- c. Increase personnel staff funding in coordination with and approval by Army proponent staff offices.

1.2.4 Specific Projects to Meet Action

- a. Publish energy office manpower staffing guidelines
- b. Revise the SGO for DPW and or Garrison Commander
- c. Implement standardized job descriptions
- d. Survey available training courses and sources
- e. Develop recommended training tracks/levels
- f. Formulate process for obtaining self-sustaining REMs to support installation energy management programs where cost-effective.

1.2.5 Funding Strategies and Sources

- a. Solicit increase in central funding to develop preliminary training course complementary to certified energy manager training.
- b. Continue to centrally fund annual energy manager training for turned-over personnel.

1.2.6 Description of End State

Fully dedicated, trained and certified energy/water management staff at each organizational level.

1.2.7 Metrics of Success

- a. Staffing standards prepared, approved, and implemented.
- b. Job descriptions written and approved for all energy management positions, from engineer technicians to general engineers, GS-09 to GS-14 levels.
- c. Additional manpower requirements/authorizations are recognized and provided.
- d. Centralized/regional contracts for procuring REMs are in place.
- e. Army-specific energy/water managers training courses developed for Levels 1 & 2.
- f. At least one full-time Level 3 certified energy manager, either government employee or REM, on staff at each MACOM, region and major installation.

1.2.8 Milestones (actions by FY)

Develop centralized/regional contracts for procuring REMs	FY 2007
Develop and implement staffing standards	FY 2007
Revise Standard Garrison Organization for DPW to define location and staffing of the installation energy office	FY 2007
Develop standardized job descriptions	FY 2007
Develop Army-specific energy/water management training courses	FY 2007
Develop Army-specific utilities sales and acquisition training courses	FY 2007
Energy managers at all mid- to large-size installations	FY 2008
Have all energy managers Level 1 certified	FY 2008
Have all energy managers Level 2 certified	FY 2009
Have all energy managers Level 3 CEM certified	FY 2010
Obtain recognized and authorized energy manager positions and provide full staffing for energy program at all organizational levels	FY 2010

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.3 Action #3: Create a Management Decision Package (MDEP) for Energy Management

1.3.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Create synchronization matrix for overall Campaign funding requirements. (S)
- b. Develop tiered hierarchy for funding priority, based on what must come first (that is, staff), logical follow on sequence of objectives, potential savings (worst condition-largest first, low hanging fruit). (S)
- c. Create initial funding strawman. (S)
- d. Structure Army Energy Campaign Plan funding requirements into format for submittal into bi-annual program objective memorandum (POM). (S)

1.3.2 Technologies and Tools Required

- a. AEWRS data to rank energy use by installation, thousand British thermal units (KBtu) per square foot (sf) per year, KBtu/person/year.
- b. Installation Status Report (ISR) output showing system condition
- c. Cost estimate data

1.3.3 Policies, Management, and Institutional Issues

- a. Change in institutional mindset to work at funding in a comprehensive manner.
- b. Improved planning and programming at installation level.

1.3.4 Specific Projects to Meet Action

- a. Work session to develop first funding matrix
- b. Identify FY 2006 and FY 2007 funding required to keep program afloat
- c. Collect specific information as required from the installations (staffing costs, project costs, etc.)

1.3.5 Funding Strategies and Sources

Action is already funded through current manpower budget.

1.3.6 Description of End State

Dedicated Funding Stream for Energy Management Program and projects

1.3.7 Metrics of Success

Establishment of dedicated MDEP for energy and water initiatives.

1.3.8 Milestones (actions by FY)

Prepare matrix	FY 2006
Obtain cost data	FY 2006
Develop FY08-13 POM input	FY 2006
First quarter distribution of program funding	1Qtr FY 2008

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.4 Action #4: Establish energy management accountability throughout the chain of command

1.4.1 Approaches to Meet Actions and Priorities (S, M, L)

Installations will make the management of energy part of everyone's priority list by making it part of their job description. Making energy stewardship a team effort, where we are accountable to each other for our use or abuse of these vital resources is a needed cultural shift on Army installations. A process of reporting and review will be established, augmented by ongoing awareness and awards and recognition. (S)

1.4.2 Technologies and Tools Required

Job performance standards and a balanced scorecard will need to be developed.

1.4.3 Policies, Management, and Institutional Issue

Include an energy management element into performance standards and Officer Evaluation Reports.

1.4.4 Specific Projects to Meet Action

- a. An energy accountability program will consist of directives and guidance for installation level steering committees, annual reports at the DPW conference, and addition of an energy management element into job performance standards.
- b. Installations will establish energy steering committees which include the garrison commander, the installation commander, the DPW, equipment purchasers, budgeters, building operators, building energy managers and select building occupants. They will meet on a quarterly basis to review activities affecting energy/water consumption, review local goal performance, discuss ideas, evaluate successes and develop strategies for improvement.
- c. Establishment of an energy accountability break out session at the annual DPW conference will bring representatives from the installation level steering committee together with others up the chain of command including regional managers, IMA and MACOM office representatives outside of the IMA chain of command.
- d. Job performance standards will be established at each level of command. Individuals can have a significant impact on the installation energy program. Standards will recognize where individuals have made real effort and did what they could within resource constraints. A balanced scorecard to rate energy performance across installations will be developed.
- e. Include tracking progress toward incorporating energy accountability in job descriptions and conduction of installation energy committee meetings into the annual report process.

1.4.5 Funding Strategies and Sources

Performance will be achieved through existing manpower funding resources.

1.4.6 Description of End State

An Army culture where all personnel have a stake in responsible, efficient use of energy and water resources.

1.4.7 Metrics of Success

Measurable metrics of success include:

- a. The percentage of installations that have established an active energy management accountability network as demonstrated by conducting quarterly energy committee meetings.
- b. The percentage of installations that report at the annual DPW break out session.
- c. Scoring on a balanced scorecard across installations.

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1.4.8 Milestones (actions by FY)

Guidance on energy steering committees	FY 2007
Establishment of DPW breakout review session	FY 2007
Establishment of job performance standards	FY 2009
All major installations have an energy steering committee	FY 2008

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.5 Action #5: Develop and implement information and knowledge management systems

1.5.1 Approaches to Meet Actions and Priorities (S, M, L)

The gathering and distillation of utility information is essential to understanding if we are progressing in the desired direction with energy and water stewardship. It is an effort that highlights the opportunities for improvement and enables substantial savings. To this end the Army will verify its installation level and Army level consumption baseline, increase the integrity of gathered data, identify appropriate additional data gathering requirements, expand metering of utility flows to the building level, and implement automated, integrated metering monitoring and controls.

Energy analysis assessment of end use including facility end use will be conducted annually with increasing levels of detail as metered data becomes available and models evolve to more accurately reflect the building inventory.

Utility consumption patterns form the basis for assessing if utility rate schedules are appropriate. Time of use, demand charges and uninterrupted status charges can far exceed commodity consumption charges. The Army will engage in periodic review of all utility rate tariffs for installations to determine that the installations are receiving the best rate for the load profile of the installation.

The management of intellectual assets is vital to organizational productivity. It allows groups to do more with fewer resources, at a higher quality level and a faster pace. It exploits the collective experience of an institution to its best advantage. Effective knowledge management allows staff to augment their own skill set with pertinent shared ideas and advice without experiencing information overload. Building on the current AEWRS expansion effort, the Army will develop a Centralized Knowledge Management System. This system will combine existing databases, streamline data retrieval options, increase online analysis capabilities, expand the breadth of the knowledge base, enable information sharing, and provide Army resource managers with the information and insight they need. Resource information will be available through the Performance Metric Warehouse, being developed in the Office of the Assistant Secretary of the Army for Financial Management and Comptroller. System users would be able to make one stop to decipher who (people), what (data and knowledge), why (objectives and rationales), where (locations), and how (strategies and technology) of energy and water management.

1.5.2 Technologies and Tools Required

Information and knowledge management efforts will make use of Army databases (AEWRS, HQEIS, ISR, and IFS), pertinent websites (including those of the Army Energy Program, OSD and IMA), appropriate energy profiles and models (CBECS/Energy Star, FEDS, REEP and Energy-10) and evolving knowledge management web systems (Army Knowledge Online and Engineering Knowledge Online). Work will be informed with insights and collaboration with current and planned energy performance benchmarking studies by ASHRAE, OSD, DOE, USACE and IEA. Present guidance on metering and controls will need to be updated and expanded and commissioning guidance will need to be developed.

1.5.3 Policies, Management, and Institutional Issues

EPAct 2005

There is no direct requirement in the EPAct 2005 related to development of knowledge management systems. The requirement of the EPAct 2005 found in Section 103: "Energy Use Measurement and Accountability" is indirectly related in that it requires all buildings, for the purpose of efficient use of energy and reduction in the cost of electricity used, to be metered by FY 2012, which can be an element of the knowledge management system. EPAct 2005 directs that such data from metering shall be incorporated into Federal energy tracking systems and be made available to Federal facility managers.

Management and Institutional Issues

Installations are required to submit energy and water consumption data to AEWRS monthly, real property data to AEWRS and ISR annually, water use and installation operations cost and condition information to HQEIS and ISR annually, and rolled up utility information for the Annual Report to Congress on Federal Government Energy Management. However, currently only OACSIM has accountability for reporting energy and water consumption for the Annual Report to Congress. Short-staffed installations may report to Army databases sporadically, incorrectly, or not at all. Linking reporting requirements to funding approval or job performance elements, or shifting reporting requirements to utility providers will reduce reporting gaps. Providing immediate online feedback that flags suspect data will reduce data inconsistencies.

1.5.4 Specific Projects to Meet Action

Several projects will be necessary to meet the intent of this Action. These include:

- a. Data validation and database expansion and integration will be high priorities for short-term completion. Deferral of these actions will make future attempts to track efficiency progress difficult or irrelevant. Augmentation of the AEWRS database will verify an FY 2003 energy and water baseline, effect timely input of data, increase the integrity of the dataset for more meaningful interpretation and provide online trending analysis. Evaluation of data capture requirements will add data fields (such as facility usage characteristics) that are not currently being populated but will significantly improve our ability to benchmark the energy performance of our facilities. Integration of databases will allow for easier data retrieval and consistency of information.
- b. Utility metering and control, cost schedule review and message dissemination will be ongoing efforts that begin as soon as funding allows and continue incrementally for the long-term. Development of a metering/control/commissioning plan will systematically address the metering requirements of EPAct 2005 and tap into the abundant saving opportunity of appropriately controlled buildings. It will establish an action schedule and a process for sustaining capabilities.
- c. Utility cost schedule review will take place at 10% of installations per year to ensure that our limited funds are utilized as effectively as possible. The expansion of the Army energy website to include capabilities to interface with data stores and aggregate useful resources will continue to get information to those who need and will benefit from it.
- d. Energy analysis assessments and knowledge management will be mid- to long-term endeavors that will reap dividends. Energy analysis assessment of utility end use, which takes advantage of real time data and consumption models, put consumption trends into perspective. A knowledge management program will allow the Army to make the most of its collective skill set. Activities will include data access, libraries of pertinent reports, and collaborative communities of practice that share best practice methods and lessons learned.

1.5.5 Funding Strategies and Sources

A combination of in-house and out of house funding sources is possible for this action. Central funding is probably the most appropriate for data/knowledge management and metering and controls efforts. Collaboration with other groups working on metering/ monitoring/ energy performance metrics could leverage resources. Contracted rate reviewers and commissioning teams could take a percentage of the realized savings as payment.

1.5.6 Description of End State

This action will give the Army a solid understanding of its utility requirements and usage profiles by building function and climate. It will establish well-characterized energy performance metrics for all facilities. It will support installation energy managers with readily accessible information and tools. Interoperable metering, monitoring and control capability will posture us for ongoing efficiency improvements.

1.5.7 Metrics of Success

Quantifiable metrics of success are: percentages of installations reporting to utility databases, percentages of automated utility reporting, percentages of installed automatic reading meters, percentage of utility rate review, and percentage of energy analysis assessments.

1.5.8 Milestones (actions by FY)

AEWRS FY 2006 (100% validated FY03 baseline data)	FY 2006
Additional data requirement	FY 2007
Knowledge Management Systems	FY 2008-15
Rate reviews of utility systems, 10%/yr	FY 2007-25
Energy analysis assessments, 10%/yr	FY 2008-25

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.6 Action #6: Develop a Utilities Modernization and Recapitalization Program for 100% of Government-owned utilities systems

1.6.1 Approaches to meet actions and priorities (S, M, L)

- a. Determine overall requirement based on Integrated Facilities System (IFS), Installation Status Reports (ISR) and force structure and stationing projections. (S)
- b. Prioritize installations and provide adequate funding to assess and implement 10% of projects each year. (S)
- c. For FY 2008 POM pick one or two high value targets to start program ahead of full implementation of "Campaign Plan." (M)
- d. Use ACSIM/IMA organization to guide, program and execute. (S)
- e. Viable UM/Recap program established. (S)
- f. Installations identify and submit UM/Recap projects. (S)
- g. Use criteria, including mission value, to select projects. Distribute equitably across spectrum to support fairly. (S)
- h. Establish management process and reevaluate priorities every 2 years. (M)

1.6.2 Technologies and Tools Required

- a. Integrated Facilities system (IFS).
- b. Installation Status Report (ISR).
- c. Force structure and stationing projections.

1.6.3 Policies, Management, and Institutional Issues

- a. Policy/criteria to establish the program

1.6.4 Specific Projects to Meet Action

- a. Complete template to show utility system scope condition, age, modernization costs
- b. Project identification at the installation level

1.6.5 Funding Strategies and Sources

- a. Funding for technical support at installations to develop initial list of projects and costs.
- b. Project funding

1.6.6 Description of End State

- a. Reliable funding stream
- b. Modernized government owned utility systems
- c. All government owned systems modernized or recapitalized to meet efficiency goals by FY 2015.

1.6.7 Metrics of Success

- a. Data on 100% of qualifying government owned utility systems received from installations
- b. Project funding of at least 90% of projects identified within a FY.
- c. Program execution of 100% within a FY.

1.6.8 Milestones (actions by FY)

Develop program policy with definitions of qualifying systems	4Qtr FY 2006
Data call per program policy	4Qtr FY 2006
Review/select projects for FY09	1Qtr FY 2007
Develop outyear project list FY10-15 POM	2Qtr FY 2007

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.7 Action #7: Develop an Energy Assessment Guide for energy managers and energy services contractors to use for conducting comprehensive energy assessments at Army installations

1.7.1 Approaches to Meet Objectives and Priorities (S with continuous updates)

The Energy Assessment Guide will provide Army energy managers, energy auditors and ESPC contractors with a tool for conducting consistent and comprehensive energy assessments at Army installations. This Guide will document resource consuming activities, and identify wasteful practices, prioritize conservation opportunities, implement best practices, and guide investment in resource conserving technology upgrades. The Guide will address different breadth of energy assessments: installation-wide, building-wide, system-wide or system components with the several different levels of assessment:

- a. Energy conservation opportunities analysis. This uses basic analysis techniques to generate a list of top energy saving ideas without using instrumentation for data collection (Level 1).
- b. Energy optimization analysis geared toward funds appropriation. This calculates savings and uses partial instrumentation with cursory analysis (Level 2).
- c. Detailed engineering analysis with implementation, M&V. This includes performance measurement and verification assessment, and a fully instrumented diagnostic audit (Level 3).

The Guide will develop the rationale behind each of three levels of assessment. It will state the motivations behind undertaking each level, the expected results, and the degree of effort and instrumentation required.

The Energy Assessment Guide will specify procedures and suggest the format of the report that will document the assessment findings.

1.7.2 Technologies and Tools Required

- a. The Energy Assessment Guide can be used in the analysis for energy waste reduction and serve as a basis for the development of ECIP, OMA and ESPC projects.
- b. Energy conservation opportunities generated during the Level 1 analysis will be matched with the database of promising energy saving technologies and measures (current, proven, well known or underused) recommended for building retrofits (see Initiative 2, Action 2).
- c. Results of the engineering analysis of ECMs and retrofit options be assessed using an approved life-cycle costing analysis tool, such as the Building Life-cycle Costing (BLCC) tool during the Level 2 study.
- d. Building energy simulation tool will be used to predict energy use when ECMs applied.

1.7.3 Policies, Management, and Institutional Issues

- a. Incorporate quantitative measurable energy performance requirements to buildings with area over 10 thousand square feet (KSF) gross, when they undergo major renovation.
- b. To complement the LEED certification program, develop details and format of building energy certification program. Link results of energy performance with the incentive program (retain savings, reward and recognize champions, etc.)
- c. Army installations conduct Level 1 and Level 2 energy assessments by an independent team of experts.
- d. Request that Army installations conduct regular inspection of AC systems with an effective rated output of more than 12kW, Inspections shall include an assessment of AC efficiency and the sizing compared to the cooling requirements of the building.
- e. Request, that Army installations conduct a regular inspection of boilers fired by non-renewable liquid or solid fuel of an effective rated output of 20kW to 100kW. Boilers with an effective output of more than 100kW shall be inspected at least every 2 years. For gas boilers this period may be extended to 4 years. All high pressure steam boilers (pressure greater than 15 pounds per square inch) and all high temperature hot water boilers (temperature greater than 250 degrees Fahrenheit) in active use will be inspected by certified boiler inspectors at least twice annually.

- f. For heating systems with boilers of an effective rated output of more than 20kW, which are older than 15 years, establish a one-off inspection of the whole heating system. On the basis of this inspection, which will include an assessment of the boiler efficiency and the boiler sizing compared to heating requirements of the building(s) the experts shall provide advice to the users on the replacement of the boilers, other modifications to the heating system and other alternative solutions.

1.7.4 Specific Projects to Meet Action

Develop an energy assessment guide. Development of the guide would be through participation in a joint effort with recognized energy efficiency experts, such as the DOE FEMP, DOE Office of Industrial Technologies Energy Assessment Centers, USACE Huntsville Center of Excellence and an international consortium of energy experts.

1.7.5 Funding Strategies and Sources

Action would be funded through HQDA, OACSIM. As a possible alternative, the Energy Assessment Guide could be developed through funding Army participation and leadership in a collaborative effort with other Federal agencies and the international community. This effort could be leveraged by labor contributions from DOE/ FEMP, DOE Office of Industrial Technologies Energy Assessment Centers, USACE Huntsville Center of Excellence a well as international energy experts.

1.7.6 Description of End State

The Energy Assessment Guide will be used to identify energy inefficiency at all Army installations and to craft energy retrofit projects.

1.7.7 Metrics of Success

Establishing quantitative measurable energy performance requirements in combination with the consistent energy assessment methodology and a balanced funding strategy to execute energy projects will result in better Army energy usage, efficient allocation of limited funds and better management of energy and financial resources.

1.7.8 Milestones (actions by FY)

Produce first draft of the Energy Assessment Guide	FY 2007
Develop a pool of energy assessment experts to guide Armywide energy assessment process.	FY 2007-08
Produce final draft of Energy Assessment Guide	FY 2008
Begin implementing the energy assessment process Armywide using the Energy Assessment Guide	FY 2009

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.8 Action #8: Develop a funding stream for energy projects

Facility managers face many facility infrastructure improvement demands, with energy projects competing with immediate facility repair needs. A significant barrier to developing and implementing energy projects is funding, in an environment of shrinking facility operations budgets. Installations must be able to identify energy improvement requirements and pursue appropriate funding programs to execute energy projects.

1.8.1 Approaches to Meet Actions and Priorities

Energy Audits (S - HQ IMA w/centralized contract)

Conduct energy audits to assess energy use, cost-effective energy system retrofits with energy efficient equipment, water conservation and renewable energy opportunities. The Army will use a program such as the Energy Engineering Analysis Program (EEAP) with an initial target of conducting energy end use assessments at 10% of installations with high energy use facilities annually to identify energy efficiency, water and renewable energy opportunities. An important EEAP deliverable to include preliminary recommendation of funding strategies for energy projects identified. Recommended prioritization of site selection for EEAP program activity would be:

- a. largest deviation from annual energy reduction goal;
- b. largest annual energy use;
- c. largest annual energy cost; and/or
- d. most energy intensive per unit area of buildings.

The Army will supplement building audit programs with limited audits conducted during Energy Awareness and Conservation Assessments (EACA). Discussion of the program is presented as a separate Action later in this section.

Web-based Training for Energy Project Development (S - OACSIM)

- a. **Building Life-cycle Cost Analysis.** Submission of candidate projects for appropriated funding of energy conservation projects under the Energy Conservation Investment Program (ECIP) requires life-cycle cost analysis to project discounted payback and savings to investment ratios (SIR) to rank projects by economic benefit over the project life. Anticipating some level of turnover of Army energy managers, web based Federal Building Life-cycle Cost (BLCC) analysis training should be readily available at little cost , to travel and off-site time attending training workshops) and provide internet access to National Institute for Standards and Technology (NIST) BLCC training staff for technical support.
- b. **Alternative Financing.** Despite the existence of some level of appropriated funds for energy projects (that is, ECIP), to achieve the energy reduction, water conservation and renewable energy goals of the EPAct 2005, Army energy managers will need to aggressively pursue private sector financed mechanisms for energy project funding. Web-based training on alternative financing approaches such as ESCP, Utility Energy Savings Contracts (UESC) and the unique DOD authority provided by Enhanced Use Leases (EUL) can expose facility energy managers and installation acquisition team personnel (contracts, legal, environmental, building managers) to the contracting processes and contractual/technical requirements for successful private financed energy project contracts.

Energy Project Funding Guidance (S-OACSIM): A key step in expanding efforts to implement energy saving projects is the promulgation of information and guidance on appropriate financing mechanisms. OACSIM will provide this capability through the Army Energy Webpage, reference to the DOD Energy Managers Handbook, and development of any supplemental guidance to clarify or emphasize specific funding mechanisms as needed.

Centralized Procurement of Alternative Financing Project Expertise (S- OACSIM): Military Construction (MILCON) and ECIP building projects usually provide funding for design and construction contracting and supervision, inspection and overhead funds for project implementation and acceptance. All of the alternative financing procurement approaches (ESPC, UESC, EUL) typically only provide funding for project development and construction, leaving the installation to bear the overhead costs. Despite the Army and other Federal agency success in using alternative financing approaches for energy projects, the lack of dedicated funding for broad centralized program management has slowed procurement timelines. With direct funding to energy project technical and acquisition teams, the procurement timeline can be significantly reduced and energy project savings realized sooner.

There are private sector and Federal agencies with extensive experience and specific technical and contractual expertise available to support and enhance the capability and effectiveness of the Army acquisition team developing and implementing alternative financed energy projects. With a centralized team to procure external personnel with such expertise, a valuable resource can be rapidly provided to accelerate on the job training and success of the Army energy project acquisition teams, resulting in streamlined procurement timeline.

1.8.2 Technologies and Tools Required

Appropriated Fund Projects

Energy Conservation Investment Program (ECIP): Annually DOD appropriates capital funds to the Army for ECIP projects. Army installations submit energy project funding requests on DD Form 1391 (Military Construction) for consideration and selection, primarily based on the project's savings to investment ratio. Defense policy also directs the Army and other DOD services to allocate a portion of the ECIP appropriated funds for renewable energy projects, allowing a discounted payback of up to 25 years.

Alternatively Financed Projects – Public/Private Partnership Approaches

Energy Saving Performance Contracting: the ESPC allows the Army to obtain energy project services from an energy services company in exchange for the utility cost avoidance generated by the projects, under 42 USC 8287. Services received include energy project scoping, design, financing, installation, and equipment operations and maintenance. ESPC offers the opportunity to bundle multiple energy efficiency, water conservation, and renewable energy projects into a collective cost-effective project within a multi-year (typical 15 year) contract term. Through fiscal year 2005, this public/private partnership approach has delivered over \$1.6 B in private sector investment at Federal facilities in the U.S. and overseas. Due to the manpower and administrative resources to execute an ESPC project, application is best suited for projects with moderate to high private capital investment.

ESPC projects are not subject to the Office of Management and Budget scoring requirements (OMB Circular A-11), meaning the Army may enter an ESPC contract without funding the total cost of the contract at award. Significant expertise in the ESPC program exists at the Army Corps of Engineers, Huntsville Division and the DOE FEMP, which both manage indefinite delivery indefinite quantity (IDIQ) ESPC contracts that are usable by any Federal agency. Use of an existing IDIQ contract can significantly reduce execution timelines.

Utility Energy Services Contracts (UESC): UESCs authorized by 42 USC 8256, are similar to ESPCs, but the service provider is the Army installation serving utility company. The UESC process involves the utility company conducting a preliminary audit at no expense to the Army installation to identify the energy project potential. If an economically attractive project exists, the utility and Army will execute a contract to conduct a feasibility study at a negotiated study price. If the feasibility study confirms an economically feasible energy project, the utility and Army may negotiate a contract, where the utility company will then study, design, finance and install the energy saving project. The utility company may also maintain the installed equipment, subject to agreement between the two parties. Army payment for utility investment, services and financing is provided from annual utility & O&M cost savings achieved. UESCs do not require guaranteed annual cost savings, although savings measurement and verification may be negotiated into the terms of the contract. Not all serving utilities offer UESC programs, however UESCs have been implemented with investments as low as \$200K and up to \$50M. The contract term of a UESC cannot exceed 10 years. Like ESPCs, UESCs can incorporate bundling of

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energy efficiency, water conservation or renewable energy measures. Since UESCs were authorized in the EPAct 1992, the utility industry has invested nearly \$1B for energy projects at Federal facilities. Similar to ESPC projects, UESC projects are not subject to OMB scoring requirements.

The General Services Administration (GSA), DOE, DOD and the utility industry collaborated to develop model contract documents for UESCs, enhancing site specific adaptation and less costly than developing a UESC from scratch.

Enhanced Use Leasing (EUL): Within DOD, EUL is authorized by 10 USC 2667, which allows DOD installations to lease land (land considered non-excess) to a private developer for some consideration up to a term of 50 years. In the energy arena, EUL has been used for privately financed installation, operation and maintenance of large cogeneration systems to provide commercially available electrical and thermal energy.

The key consideration of EUL is to ensure the agreement is perceived as a capital lease rather than an operational lease. With an operational lease, the government and the private developer partner for mutual benefit, but also mutual commitment. With a capital lease, the government avoids risk by maintaining a strict landlord-tenant relationship. Under a capital lease, the government's benefit is limited to the leased value of the property the private developer occupies, however this arrangement avoids any commitment by the government to support the developer's financial endeavors, thereby relieving the government of any risk and eliminates any need of OMB scoring requirements.

Web-based Energy Program Training

The Army activity to develop web based training programs should initially review and consider using existing web-based training programs.

For Building Life-cycle Cost (BLCC) analysis training needs, NIST offers web-based training and technical support for this Federal standardized LCC program used for ECIP 1391 submissions. NIST's BLCC program also includes a module to conduct LCC analysis of a private financed project alternative, such as ESPC.

For ESPC and UESC project training:

- a. The Air Force Civil Engineering Support Activity (AFCESA) currently has a web-based ESPC training course required for Air Force acquisitions teams planning to pursue an ESPC project.
- b. DOE FEMP conducts ESPC (Basic and Advanced) and UESC workshops and plans to develop web-based ESPC and potentially UESC in FY 2006.

Centralized procurement of alternatively financed project technical expertise

There are several existing procurement methods to acquire expertise for alternatively financed project technical expertise. Key action for Army centralized procurement team action is to develop a scope of work for the technical expertise required and a Government estimate.

- a. GSA Federal Supply Schedule–Energy Management Solutions Task Orders at:
<http://www.gsaelibrary.gsa.gov/ElibMain/ScheduleSummary?scheduleNumber=871+II>
- b. Army Corps of Engineers, Huntsville–MIPRs for ESPC/UESC expertise
- c. DOE FEMP's' Golden Field Office–Interagency Agreements for ESPC/UESC/EUL expertise

1.8.3 Policies, Management, and Institutional Issues

Financial Incentive program for Energy Projects at Army Installations: Despite the expectation that Army installations should pursue energy project implementation to support Army energy and water reduction and renewable energy use goals, an incentive program benefiting the Army installation energy program or other Commanding Officer program for military or civilian program helps to prioritize energy management and project development activities. The Army (OACSIM) is developing a clear policy to implement the energy savings retention authority per 10 USC 2865. That authority currently allows:

- a. Half of energy cost savings unobligated at fiscal year end, to be accrued into an account for reinvesting in energy projects, installation training, and acquisition of energy project expertise until expended;
- b. Half retained at the installation for discretionary use by the installation commander.

Top Down Support and Policy Guidance for Alternatively Financed Energy Projects.

Army installation acquisition team development of alternatively financed energy projects are time intensive and financially and contractually higher risk than normal service or supply procurements, particularly due to long contract terms. Army HQ, OACSIM, IMA should issue policy or directive to garrison commanders to encourage increased use of energy projects using alternatively financed projects with a clear message that Army leadership strongly supports installation pursuit of alternatively financed projects. Such encouragement would significantly mitigate any reluctance by the site acquisition team, particularly the Contracting Officer, to implement projects with greater complexity and higher financial risk.

1.8.4 Specific Projects to Meet Action

- a. Methodical process of conducting detailed energy audits at prioritized locations, determining appropriate funding strategies for recommended energy projects and providing detailed project documentation for projects to be submitted for funding with appropriated funds.
- b. Increase availability of alternative financing training resources for installation personnel.
- c. Centrally funded manpower resources for developing and executing alternatively funded energy projects.

1.8.5 Funding Strategies and Sources

MDEP funds allocated for energy audit and project development, alternatively financed project contract administration, and oversight/validation of ESPC measurement and verification procedures.

Unobligated utility funds attributable to energy savings carried over to subsequent fiscal years and used for energy saving projects of smaller scale than those typically executed through ECIP or alternative financing.

1.8.6 Description of End State

Energy efficiency goals (KBtu/sf) required by Executive Order and Legislation (for example, the EPAct 2005) achieved.

1.8.7 Metrics of Success

At least 10% of Army facility inventory audited for energy saving projects annually; timely execution of all projects funded by appropriated funds; successful implementation of all projects for which alternative financing is pursued and developers offer funding.

1.8.8 Milestones (actions by FY)

Develop Energy Project Funding Guidance	FY 2007
Develop Web-based Training Program	FY 2007
Centralized Procurement, Alternative Financing Project Expertise	FY 2008

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.9 Action #9: Establish an effective energy and water management incentive awards program

1.9.1 Approaches to Meet Actions and Priorities (S,M,L)

- a. Revise Secretary of the Army Energy and Water Management Awards criteria and evaluation process for individual and installation awards. (S)
- b. Establish cash incentives for regions and installations that lead the way in reducing energy consumption. Program can be modeled on the ACOE program where Garrison commanders receive a check for coming in first, second, and third place for having reduced energy consumption the greatest amount from the previous FY. (M)
- c. Develop a mixture of awards that maximize use of monetary and non-monetary incentives (for example, cash , TDY funding for energy related workshops and conferences, plaques, medals, certificates, etc.) (S)

1.9.2 Technologies and Tools Required

- a. Information resources to promote and publicize award programs
- b. Qualified evaluators to determine reward worthiness
- c. Funding for monetary awards to accompany recognition

1.9.3 Policies, Management, and Institutional Issues

The DOE conducts an annual award ceremony to recognize individuals and small groups for energy conservation accomplishments, typically related to implementing specific energy saving projects. The Army's award program recognizes broad energy management programs that reach deep into the community. The Secretary of the Army Energy and Water Management Award Program recognizes those responsible for executing installation and regional energy management programs for their progress toward achieving energy goals based on their level of innovation, savings, quality and effort.

Nominations to the Army program are screened by a small team represented by the Active, Reserve and National Guard Components. For those determined as viable award candidates, a representative of the Army Energy and Water Management Office at OACSIM will conduct site visits to validate recognition worthiness.

Installations are capable of establishing limited scale energy award programs offering rewards within their local level of authority, such as items related to administrative leave and free services at morale, welfare and recreation facilities.

Central funding for moderate reward at the installation level would greatly enhance community interest in saving energy. Awards for "best" and "runner-up" energy saving installation in the range of \$250 to \$400 thousand would provide great incentive and generate substantial energy conservation effort throughout the Army. The program will stimulate community interest and the general public will develop better energy conservation habits, however personnel turnover will cause an ongoing need for an active recognition/reward program.

1.9.4 Specific Projects to Meet Action

- a. Revise Secretary of the Army Energy and Water Management Award criteria
- b. Participate on DOE's annual award nomination evaluation panel and conduct site visits of qualified candidates for the Secretary of the Army Energy and Water Management Awards.
- c. Establish central funding for substantial monetary recognition, starting with the 30th Annual Secretary of the Army Energy and Water Management Awards for performance achieved during FY 2007 and recognized in a ceremony in FY 2008.

1.9.5 Funding Strategies and Sources

- a. Execute basic overall award program oversight and management through existing manpower resources
- b. Incorporate energy award funding into proposed energy MDEP.

1.9.6 Description of End State

A widely recognized energy/water management awards recognition program.

1.9.7 Metrics of Success

- a. Develop and publish revised Secretary of the Army award and evaluation criteria prior to the FY 2006 nomination cycle.
- b. Establishment of a funding source for energy award competition.

1.9.8 Milestones (actions by FY)

Publish Secretary of the Army Energy and Water Management Award revised awards and evaluation criteria	FY 2006
Establish funding source for significant reward of accomplishments recognized in the Secretary of the Army Energy and Water Management Awards Program	FY 2008

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.10 Action #10: Execute an Energy Awareness Program

1.10.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. The Army Energy Office within the Office of the Chief of Staff for Installation Management (OACSIM) will promote information on energy awareness to Army installations, Army Reserve organizations and National Guard Bureau facilities. (S,M)
- b. HQDA/OACSIM will promote energy awareness site visits by qualified energy survey teams to boost installation understanding of energy conservation principles.

1.10.2 Technologies and Tools Required

- a. Use list servers for distributing information throughout the Regions, NGB and USAR.
- b. Maximize the use of existing web sites to post information and materials.
- c. Contract services for facility energy surveys and on-site presentations on savings opportunities and requirements to community assemblies.

1.10.3 Policies, Management, and Institutional Issues

- a. Existing procedures and publications on energy awareness will be updated and all responsibilities for the Army's Energy Awareness Program will be centrally managed by OACSIM.
- b. Partner with DOE for awareness material development and distribution
- c. Coordinate with Environmental offices to align Energy Awareness Month, Energy Conservation Week and Earth Day activities.

1.10.4 Specific Projects to Meet Action

- a. Partner with DOE and DOD for ideas on specific projects
- b. Develop method for prioritizing requirements and conduct energy awareness and conservation assessments at all major Army sites over a ten year period.
- c. Conduct Energy Awareness and Conservation Assessments at selected installations.
- d. Provide means to measure savings from awareness programs.

1.10.5 Funding Strategies and Sources

- a. The current funding stream will remain in effect until such time as OACSIM has been able to get HQDA to increase the level of support for this activity. OACSIM will continue to collaborate with DOE on purchase and distribution of awareness materials.
- b. IMA, USARC and NGB need to program long-term requirements for conducting energy awareness site visits

1.10.6 Description of End State

- a. All Army facilities and staff will gain a better understanding of how to help eliminate energy waste through education and training.
- b. Enhanced awareness will enhance/improve conservation efforts and installation level programs.

1.10.7 Metrics of Success

Energy consumption is reduced at or below the new glide path established by the EPAct 2005.

1.10.8 Milestones (actions by FY)

ICW FEMP/DOE develop list of appropriate literature and publications for energy awareness	FY 2006
Conduct Energy Awareness and Conservation Assessments (EACA) annually at selected installations	FY 2006-25
Report energy awareness progress in annual report to OSD each year	FY 2006-25

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.11 Action #11: Establish effective utilities procurement strategies.

1.11.1 Approaches to Meet Actions and Priorities (S, M, L)

Discussion:

Utilities services will be procured from other Federal, local, municipal, regional, or private utility distribution companies or suppliers, as allowed by laws and regulations, at the lowest overall total life-cycle cost (or best value) to the Army, consistent with appropriate regard for high health and sanitation, adequacy to support needs, efficiency of operations, and reliability of service.

Establish an effective utilities procurement system by: (M)

- a. Educating staff
- b. Providing tools
- c. Periodic reviews of utility costs/contracts (by internal or contracted experts).

1.11.2 Technologies and Tools Required

- a. Updated utilities contracting and utilities reimbursement regulations and guidance.
- b. Develop an introductory utilities contracting course or incorporate into existing utilities training programs.
- c. Develop an information repository for utilities contract information.

1.11.3 Policies, Management, and Institutional Issues

- a. Installations have the lead on procuring utility services, in collaboration and coordination with their region and/or MACOM. They must be aware of the ever changing practices of the utility industry to take full advantage of the opportunities available to reduce energy costs. Awareness of the procedures contained in acquisition directives pertaining to utility procurement is essential.
- b. Management must provide guidance and information on utilities procurement through central knowledge databases and adequate training to all levels and personnel involved in the procurement of utility services.
- c. Prior to award of utility contracts installations should review standard utilities contract provisions for inclusion and take action to identify requirements to include any known out year changes; determine actual demand versus contract demand; determine availability service suppliers by conducting a market survey; and prepare an acquisition plan.
- d. Determine the most appropriate utility rates and options, such as interruptible vs. fixed rates; availability of power from Federal power agencies and open markets: if services can be aggregated by purchasing multiple commodities from the same supplier or by combining requirements with other customers to leverage buying power for more attractive rates; or if considerations such as granting utility suppliers right-of-ways for service to customers off the installation will improve utility rates.
- e. Consider renewable energy opportunities through different other services and/or agencies (Western Area Power Administration (WAPA), FEMP, etc.).

1.11.4 Specific Projects to Meet Action

- a. Update utilities procurement guidance found in Department of Defense Instruction (DODI) 4000.19, Interservice and Intragovernmental Support; AR 420-41, Acquisition and Sales of Utilities Services; and develop an Army Utilities Acquisition and Sales Handbook.
- b. Develop an “Introduction to Utilities Contracting” Course
- c. Develop a standard utilities contract and utility rate template.
- d. Develop a web-based resource for utilities contracting information.

1.11.5 Funding Strategies and Sources

Incorporate increased manpower requirements for commercial utilities program oversight and rate review into program staffing requirements

1.11.6 Description of End State

Utility commodities acquired at lowest possible rates.

1.11.7 Metrics of Success

- a. Evaluation of requirements has been completed.
- b. Have installations taken steps to obtain lowest cost utility service by:
 - Reviewing utility invoices;
 - Analyzing alternative rate possibilities;
 - Considering peak shaving to avoid high demand charges; and
 - Taking advantage of competition where available.
- c. Best value purchase options have been selected.

1.11.8 Milestones (actions by FY)

Update DODI 4000.19 and AR 420-41	FY 2007
Develop basic utilities contracting instruction	FY 2007
Update utility contract and rate templates	FY 2007
Update/develop Army utilities contracting program policy website	FY 2007

Initiative #1: Eliminate energy inefficiencies that waste natural and financial resources and do so in a manner that does not adversely impact comfort and quality of the facilities in which Soldiers, their families, civilians and contractors work and live.

1.12 Action #12: Procure energy efficient equipment and products

1.12.1 Approaches to Meet Actions and Priorities (S, M, L)

The procurement process for purchase or replacement of all energy consuming devices will require the use of products that are either energy star compliant or designated by FEMP to be among the highest 25 percent of equivalent for energy efficiency. ASHRAE recommended HVAC equipment efficiencies should also be used. Energy efficient equipment should be incorporated into technical requirements for credit card purchases, O&M contracts, and other procurements methodologies. (S, M, & L)

1.12.2 Technologies and Tools Required

Guidance for products purchased is provided by the EPAct 2005, DOE, ASHRAE, Environmental Protection Agency (EPA), E-Source and other relevant publications.

1.12.3 Policies, Management, and Institutional Issues

- a. Supply contract guidelines shall be modified to require Energy Star compliant products.
- b. Assemble Army working group to review supply/O&M contracts
- c. Existing supplies will likely be consumed prior to purchasing new products. Amount of existing supplies may delay implementation.
- d. All contracts and supporting criteria documents should be reviewed annually and modified, as required, for changes in DOE, ASHRAE, and E Source recommendations.
- e. All base operating system contracts shall be modified to specify use of Energy Star or highest efficiency repair or replacement products.
- f. Section 131 of the EPAct 2005 requires DOE to establish new Energy Star qualifying levels for clothes washers and dishwashers by 1 January 2006, to be effective by 1 January 2007. The same Section requires DOE to re-establish new Energy Star qualifying levels for clothes washers by 1 January 2008, to be effective by 1 January 2008.

1.12.4 Specific Projects to Meet Action

- a. Coordinate Army policy memo on EPAct 2005 policy to purchase only Energy Star compliant products.
- b. Incorporate requirement in construction, maintenance, and repair guidance documents.
- c. Update uniform facility guide specifications (UFGS) to require use of high efficiency heating, ventilating and air conditioning (HVAC) equipment.

1.12.5 Funding Strategies and Sources

Existing funding sources will remain but may require modification. The budget request process for supply and O&M contracts should consider potential increases in cost for high efficiency products.

Additional funding will be provided for timely review and modification of Armywide criteria documents such as the Uniform Facility Guide Specifications (UFGS). This funding should be provided to USACE for proper implementation.

1.12.6 Description of End State

Energy consuming devices purchased and installed by the Army will comply with the DOE standards for energy conservation. Energy consumption will be reduced and lower efficiency products will be phased out and no longer be accepted for procurement.

1.12.7 Metrics of Success

All O&M funded contracts modified

All HVAC UFGS reviewed and modified, phased over a four-year period, then updated biennially.

1.12.8 Milestones (actions by FY)

Publish Army policy on Energy Star compliant purchases	FY 2007
Modify OMA budgets annually as needed to allow for the purchase of energy efficient equipment	1Qtr FY
Incorporate requirement in construction, maintenance, and repair guidance documents	FY 2007
75% of all O&M contracts will comply with Energy Star criteria	FY 2008
100% of all O&M contracts will comply with Energy Star criteria	FY 2013
Review and modify 100% O&M contracts annually after FY 2013 for changes in DOE and ASHRAE guidance	1Qtr FY
Modify criteria update program budgets annually as needed for modifying criteria documents for the specification of energy efficient equipment	1Qtr FY
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY 2008
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY 2009
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY 2010
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY 2011
Review and modify HVAC UFGS biennially	FY 2012-25



Tab Number 3

Initiative Number 2

**Increase Energy Efficiency
in New Construction
and Renovation**



Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

Action	Page
2.1: Develop energy performance requirements, Btu/ft ² per degrees heating and cooling per year for new construction and renovations including support facilities for utility systems	35
2.2: Develop energy design standards for new and renovated facilities to meet or exceed Federal energy performance requirements	38
2.3: Improve energy efficiency in sustainable design of new and renovated construction through LEED	41
2.4: Provide training in building design or renovations with energy efficiency technologies	42
2.5: Increase management tools for utility systems to meet the energy use measurement and accountability goals of the EPAct 2005	44
2.6: Minimize impact of fuel cost and availability at installations	46
2.7: Establish an Army utility (electricity, natural gas and other fuels) source evaluation program that selects a cost effective and secure energy source option that includes alternative sources	49
2.8: Implement authorization that allows money to be retained at the installation based on utility savings—to be used for utility projects	51
2.9: Increase performance verification in the use of alternative financing and available appropriated funds	53

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Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.1 Action #1: Develop energy performance requirements, Btu/ft²/ degrees-heating cooling/ year for new construction and renovations including support facilities for utility systems.

2.1.1 Approaches to Meet Actions and Priorities (S, M, L)

Develop energy performance requirements, in Btu/ft² /degrees heating cooling/year for all new and renovated facilities for the different DOE climate zones. Quantifiable ventilation rate requirements, thermal comfort levels and indoor air quality (IAQ) shall be listed with the energy performance requirements.

2.1.2 Technologies and Tools Required

Analysis and development of the energy performance requirements are to be formed in collaboration with the Army, EPA Energy Star Program, U.S. Green Buildings Council and DOE with input from the International Energy Agency. Requirements must be consistent with provisions of the EPAct 2005 and assure incorporation of sustainable design principles.

2.1.3 Policies, Management, and Institutional Issues

EPAct 2005

The requirements of the EPAct 2005 impacting this Action include:

Section 109 “Federal Building Performance Standards” for new Federal residential or non-residential buildings:

- a. Be designed to use 30% less energy than the level established by ASHRAE 90.1-2004 Code (<http://www.ashrae.org/>) or the International Energy Conservation Code (IECC <http://www.iccsafe.org/>), if life-cycle cost-effective.
- b. Requires that sustainable design principles are to be applied to the siting, design, and construction of all new and replacement buildings.
- c. Requires water conservation technologies be applied to the extent that the technologies are life-cycle cost-effective, if water is used to achieve energy efficiency.

Section 107 of the EPAct 2005 “Advanced Building Test Bed” requires DOE, in consultation with the Administrator of General Services, shall establish an Advanced Building Efficiency Testbed program for the development, testing, and demonstration of advanced engineering systems, components, and materials to enable innovations in building technologies. The program shall evaluate efficiency concepts for government and industry buildings, and demonstrate the ability of the next generation buildings to support individual and organizational productivity and health as well as flexibility and technological change to improve environmental sustainability.

Energy Performance Requirements: Energy performance requirements for new buildings shall be included in standard designs and requests for proposal (RFP). Building performance will be validated by design engineers, architectural-engineering firms or design/build contractors as appropriate prior to construction. Post-construction tracking will validate performance.

Energy performance requirements for renovated buildings with area over 10,000 ft² when they are undergoing major renovation (cost greater than 25% of the building’s value) shall be included in MILCON, OMA, ECIP, ESPC and other Army funded building retrofit projects. These requirements shall be met by contractors through analysis/calculation of energy performance of building using standardized methodology prior to funding approval and proven through measurement of energy use upon the projects completion.

The Army will coordinate the development of energy performance requirements with OSD-DOE energy benchmarking effort.

Army Energy and Water Campaign Plan for Installations

The Army will also coordinate requirements with energy performance with the leadership of the MILCON Transformation Program. The Army will collaborate with the U.S. Army Corps of Engineers (USACE) to reach agreement on how to most efficiently implement requirements.

Sustainable Design: Sustainable design input will require minimum levels of facility and equipment performance. The Army will work with DOD to assure that the requirements of the EPAct 2005 are implemented.

2.1.4 Specific Projects to Meet Action

- a. Create a table of average Btu/ft²/degrees heating cooling/year for each of the DOE climate zones (southeast, southwest, northeast, mid-Atlantic, Midwest, west coast, northwest, North Central, Pacific Islands, and Alaska).
- b. Create a standard for each area based on the results of the table.

2.1.5 Funding Strategies and Sources

Funding from POM cycles budgeted for initial design and creation and then annual upkeep and reviews. Additional funding is possible through collaboration with DOE/FEMP, and EPA Energy Star Program.

Army construction budgets are to be evaluated and revised to incorporate the necessary design and construction funds to assure that life-cycle cost-effective energy technologies and features are incorporated in all new Army buildings and major renovation projects.

Alternative financing opportunities such as installing life-cycle cost-effective energy efficient equipment in new construction through performance contracts should be evaluated.

2.1.6 Description of End State

All newly constructed, renovated facilities, and utility system upgrades will meet energy performance standards and conform to the EPAct 2005.

2.1.7 Metrics of Success

All newly constructed and renovated buildings will be as a minimum 30% more efficient than that prescribed by the current ASHRAE Standard 90.1-2004 per the requirements of the EPAct 2005.

2.1.8 Milestones (actions by FY)

Develop energy performance requirements (EPR) for new facilities for the first of five representative Army types of facilities: barracks, company operation facilities, large office buildings, dining facilities.	FY 2007
Integrate EPRs developed for the building types above into standards of MILCON Transformation	FY 2007
Coordinate EPRs and follow-on process with DOE activity to meet EPAct 2005 section 107	FY 2006
Integrate EPRs developed above into Army standard designs and UFC	FY 2007
Develop EPRs for remodeled facilities	FY 2007
Integrate EPR developed for remodeled facilities above into requirements for ECIP and ESPC projects	FY 2007
Develop EPRs for other types of new and remodeled facilities and incorporate them in the Army construction requirements & documents	FY 2008
Annually update of EPRs based on new technologies and knowledge which becomes available, and as ASRAE standards and IECC are updated.	FY 2009
Utility upgrade program implemented	FY 2010

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.2 Action #2: Develop energy design standards for new and renovated facilities to meet or exceed Federal energy performance requirements.

2.2.1 Approaches to Meet Actions and Priorities (S, M, L)

Provide designers, architects, energy managers and contractors with advanced energy design standards for new and renovated facilities. This document will have standards which will support energy performance requirements and will address different technologies and measures related to the potential building envelope, advanced HVAC systems, lighting, plug loads, water heating, decentralized energy supply systems, central heating plants (CHP), centralized heating and cooling systems, heat pumps, renewable technologies, etc. Coordinate incorporation of advanced energy design standards into Army Standard Designs annually through the Army Construction Standards Board. (M)

2.2.2 Technologies and Tools Required

Standards shall be based on best practices collected into a database of energy saving technologies and measures (current, proven, well known or underused). These will include technologies/measures that relate to building envelope, internal load reduction, lighting, HVAC systems, renewable technologies, energy consuming processes in buildings, supplemental energy systems (for example, compressed air, steam system), etc.

Candidate technologies/ measures presented in the database are screened for representative conditions (building type, standard climatic conditions, energy costs, etc) and application (new design and/or remodel).

The database shall include technical description of presented technologies and measures and case studies illustrated their implementation in representative conditions.

2.2.3 Policies, Management, and Institutional Issues

EPAct 2005

The requirements of the EPAct 2005 on this Action include:

Section 109 “Federal Building Performance Standards” for new Federal residential or non-residential buildings:

- a. Be designed to use 30% less energy than the level established by ASHRAE 90.1-2004 Code (<http://www.ashrae.org/>) or the International Energy Conservation Code (IECC <http://www.iccsafe.org/>), if life-cycle cost-effective.
- b. Requires that sustainable design principles are to be applied to the siting, design, and construction of all new and replacement buildings.
- c. Requires water conservation technologies be applied to the extent that the technologies are life-cycle cost-effective, if water is used to achieve energy efficiency.

Section 131 “Energy Star Program” (www.energystar.gov) will be codified and the responsibility will be divided between the EPA and DOE. Energy Star product criteria will be regularly updated and appropriate lead time be provided prior to the effective date for new or significant revisions to a product category.

Section 135 “Energy Conservation Standards for Additional Products” requires DOE to engage in rulemaking to create national energy efficiency standards and test procedures for additional products. These products include refrigerated vending machines; distribution transformers; low-voltage dry-type transformers; traffic signal and pedestrian module light fixtures; fluorescent lamp ballasts; compact fluorescent lamps; illuminated exit signs; torchiere light fixtures; commercial unit heaters; furnace fans; dehumidifiers; commercial pre-rinse (water) spray arms; battery chargers and external power supplies. See http://www.eere.energy.gov/buildings/appliance_standards/

Section 136: “Energy Conservation Standards for Commercial Equipment” requires DOE to engage in rulemaking to create national energy efficiency standards for a number of commercial appliances and equipment. These products include packaged air conditioning and heating equipment; various types of commercial refrigerators, freezers and refrigerator-freezers; commercial ice makers; and commercial clothes washers. See http://www.eere.energy.gov/buildings/appliance_standards/

Section 911 “Energy Efficiency” requires DOE to conduct programs of energy efficiency research, development, demonstration, and commercial application. Such programs shall take into consideration the following objectives:

- a. Increasing the energy efficiency of vehicles, buildings, and industrial processes.
- b. Reducing the demand of the United States for energy, especially energy from foreign sources.
- c. Reducing the cost of energy and making the economy more efficient and competitive.
- d. Improving the energy security of the United States.
- e. Reducing the environmental impact of energy-related activities.

Programs shall include research, development, demonstration, and commercial application of advanced, cost-effective technologies to improve the energy efficiency and environmental performance of vehicles; cost-effective technologies for new construction and retrofit to improve the energy efficiency and environmental performance of buildings using a whole-buildings approach including onsite renewable energy generation; advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries; and advanced control devices to improve the energy efficiency of electric motors, including those used in industrial processes, heating, ventilation, and cooling.

Section 912 “Next Generation Lighting Initiative” requires DOE to carry out a Next Generation Lighting Initiative in accordance with this section to support research, development, demonstration, and commercial application activities related to advanced solid-state lighting technologies based on white light emitting diodes. See <http://lighting.sandia.gov/Xlightinginit.htm>.

Section 1331 “Energy Efficient Commercial Buildings Deduction” allows, as a deduction, an amount equal to the cost of energy efficient commercial building property placed in service during the taxable year. The deduction under with respect to any building for any taxable year shall not exceed the excess (if any) of the product of \$1.80 and the square footage of the building. The following are the requirements:

- a. An energy efficient commercial building property means property with respect to which depreciation (or amortization in lieu of depreciation) is allowable, which is installed on or in any building which is located in the United States, and within the scope of ASHRAE Standard 90.1-2001, which is installed as part of the interior lighting systems, the heating, cooling, ventilation, and hot water systems, or the building envelope, to reduce the total annual energy and power costs with respect to the interior lighting systems, heating, cooling, ventilation, and hot water systems of the building by 50% or more in comparison to a reference building which meets the minimum requirements of ASHRAE Standard 90.1-2001.
- b. In the case of energy efficient commercial building property installed on or in property owned by a Federal, State, or local government or a political subdivision thereof, the Secretary shall promulgate a regulation to allow the allocation of the deduction to the person primarily responsible for designing the property in lieu of the owner of such property. Such person shall be treated as the taxpayer for purposes of this section.

The amendments made by this section shall apply to property placed in service after December 31, 2005. The lead agency is DOE. DOE shall promulgate regulations which describe in detail methods for calculating and verifying energy and power consumption and cost, based on the provisions of the 2005 California Nonresidential Alternative Calculation Method Approval Manual (see http://www.energy.ca.gov/title24/2005standards/nonresidential_acm/)

2.2.4 Specific Projects to Meet Action

- a. Gather information on proven efficient and renewable technologies from installations, DOE, other Federal agencies, other services, state agencies, utility companies, laboratories, vendors and implementing agencies. Incorporate regional and economic issues regarding technologies in the data base as a factor.
- b. Integrate the selected best practices to incorporate into Army Sustainability Standards on an annual basis.

Army Energy and Water Campaign Plan for Installations

- c. Evaluate applicability of including new and renewable technologies within the context of the MILCON transformation goals.
- d. Conduct annual workshops with focus on energy technologies. Invite participation by USACE, OACSIM, IMA, other services, DOE and National Laboratories, ASHRAE community, and international energy experts to share knowledge on available energy efficient technologies and measures and discuss emerging technologies and R&D needs.

2.2.5 Funding Strategies and Sources

Funding from POM cycles budgeted for initial database design. Funding budgeted for upkeep, reviews and knowledge transfer conferences. Funds may be available through collaborative efforts between the Army, DOE/FEMP and the EPA Energy Star Program.

Evaluate and revise Army construction budgets annually to incorporate the required design and construction funds for life-cycle cost-effective energy technologies and features.

2.2.6 Description of End State

USACE districts, installations, A&E firms and ESPC contractors will have the design standards that will help meet energy performance requirements with new building designs and renovations.

2.2.7 Metrics of Success

All facilities designed under the Advanced Energy Design Standards will be at least 30% more energy efficient than is required by current industry standards and will provide better energy performance and meet the requirements of the EPAct 2005.

2.2.8 Milestones (actions by FY)

Advanced Energy Standards (30% better than current ASHRAE) developed	FY 2007
Policy developed to allow alternative financing of energy efficiency and renewable improvements in MILCON projects	FY 2007
Requirement to evaluate efficiency and renewable technologies for all MILCON projects	FY 2007
Annual development and update of Advanced Energy Standards	FY 2008-25
Annual energy technology workshops	FY 2006-20

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.3 Action #3: Improve energy efficiency in sustainable design of new and renovated construction through LEED.

2.3.1 Approaches to Meet Actions and Priorities (S, M, L)

Create a minimum standard of required energy adoptions into all facilities as a minimum for LEED Silver rating by FY 2008. Current standard is LEED certification. Higher ratings based on exceeding those minimum ratings. Advanced Energy Design Guidelines will complement Army Standard Designs and provide inspiration for building energy retrofits to meet LEED specifications. These will be worked through the Army Construction Standards Board.

2.3.2 Technologies and Tools Required

An Advanced Energy Guide will be developed and will be based on best practice examples and promising energy saving technologies and measures (current, proven, well known or underused). These will include technologies/measures that relate to building envelope, internal load reduction, lighting, HVAC systems, energy consuming processes in the building, supplemental energy systems (for example, compressed air, steam system), etc.

2.3.3 Policies, Management, and Institutional Issues

EPAcT 2005

Applicable requirements of the EPAct 2005 are the same as those shown for Action 2.2.

2.3.4 Specific Projects to Meet Action

- Provide support to designers and contractors through Advanced Energy Guidelines and design guide.
- Incorporate energy experts to share knowledge in available energy efficient technologies and measures and for emerging technologies and R&D needs in this area and to promote new knowledge and methodologies.

2.3.5 Funding Strategies and Sources

Funding is through a POM line identification participation in the Advanced Energy Guides and the Army Standard Design Development.

2.3.6 Description of End State

All new construction and major renovation will meet LEED Platinum certification.

2.3.7 Metrics of Success

This program will have all new and major construction LEED Silver certification by FY 2008, LEED Gold certification by FY 2015, and LEED Platinum by FY 2020.

2.3.8 Milestones (actions by FY)

Silver certification standards of Energy Guides incorporated into design standards	FY 2007-08
Gold certification standards of Energy Guides incorporated into design standards	FY 2010-15
Platinum certification standards of Energy Guides incorporated into design standards	FY 2015-20

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.4 Action #4: Provide training in building design and renovations with energy efficiency technologies.

2.4.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Improve LCCA training and provide training to installations to include personnel in the design arena. (S)
- b. Continue CEM training for all personnel in the energy and design arena. (S)
- c. Collaborate with other Federal agencies and other services to provide training in the following subject areas: (S, M)
 - Metering design and installation.
 - Heating, ventilation and air-conditioning (HVAC) efficiencies technology.
 - Evaluation and measurement techniques for commercial and residential facilities.
 - Commissioning
 - Energy savings measurement and verification
 - Operation and maintenance of facilities for energy efficiency improvement.
 - Various codes (electric, plumbing, etc) as they relate to utility efficiencies.
 - Technical principles of electrical and thermal energy
 - Energy auditing
 - Mechanical refrigeration and chillers
 - Building automation systems, controls and utility monitoring and control systems (UMCS)
 - Renewable energy technologies

2.4.2 Technologies and Tools Required

Review and select technologies that will help achieve training objectives.

2.4.3 Policies, Management and Institutional Issues

- a. Develop a standard list of training required to ensure that all design engineers are fully trained in the area of energy engineering.
- b. Determine training requirements based on number of untrained/undertrained personnel.

2.4.4 Specific Projects to Meet Action

- a. Training development plan incorporated into OACSIM energy program and budgeted annually.
- b. POM considerations added for energy required training POM 8-13.

2.4.5 Funding Strategies and Sources

Funding stream to be developed and administered through IMA. This funding is separate from that already provided for Proponent Sponsored Engineer Corps Training courses and may be used for outside government training sources.

2.4.6 Description of End State

- a. A qualified/trained utility energy team that adopts a forward thinking approach to design of facilities.
- b. Design team knowledgeable about state-of-the-art technologies and design principles applicable to DOD facilities and motivated to apply them in "whole building," sustainable practice.

2.4.7 Metrics of Success

This program will ensure that new Army buildings will obtain increased energy management principles are strategies, and equipment, then currently existing and will assure better energy performance and use of funds for building retrofit projects.

2.4.8 Milestones (actions by FY)

Training requirements developed	FY 2007
Approved training requirements by HQ	FY 2007
Funding support provided	FY 2008
Begin training schedule	FY 2008

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.5 Action #5: Increase management tools for utility systems to meet the Energy Use Measurement and Accountability goals of the EPAct 2005.

2.5.1 Approaches to Meet Objectives and Priorities

Establish policies to install metering in all facilities where life-cycle cost-effective. Provide requirement and funding avenues to retrofit existing facilities.

2.5.2 Technologies and Tools Required

Advanced, automated and remote metering technologies will be used to collect and organize meter data into useful information. The most advanced systems will include connection of meters to energy system controlling equipment for rapid response to potential energy use problems identified through metering. Capabilities of the UMCS may include monitoring, metering, supervisory control of building automation systems on open (non-proprietary) standard industry communication protocols.

2.5.3 Policies, Management, and Institutional Issues

EPAct 2005

The requirement of the EPAct 2005 Section 103: "Energy Use Measurement and Accountability" requires all buildings, for the purpose of efficient use of energy and reduction in the cost of electricity used, be metered by FY 2012. Advanced metering or advanced metering devices that provide data at least daily and electric meters that provide hourly data shall be used. Such data shall be incorporated into Federal energy tracking systems and be made available to Federal facility managers.

Management and Institutional Issues

- a. Include utility monitoring and control system requirements in the Advanced Energy Design Guidelines.
- b. Address automated meter reading equipment and UMCS monitoring equipment and controls in energy management training programs and standardization policies.
- c. Where cost-effective use UMCS as a means of achieving the Army metering goal.

2.5.4 Initiatives to Meet Objective

- a. Develop requirements to implement existing metering standards such as standard industry communications protocols and metering hardware requirements in support of multiple vendors (non-sole source) products and installation-wide device interoperability with a UMCS.
- b. Where cost-effective, require use of UMCS to monitor system parameters and automatically adjust control devices to maintain peak operating efficiency.
- c. Require major facility infrastructure renovations to incorporate UMCS capabilities.
- d. Establish a team of controls/software experts to survey/appraise facilities for applicability, or effectiveness if already there. Experts would be capable of providing local training.

2.5.5 Funding Strategies and Sources

- a. Require metering and/or use of UMCS equipment as part of an ESPC package, as an energy saving measure and as the primary component of the M&V process.
- b. Partner with private agencies to evaluate and retrofit facilities for scheduled commissioning capabilities.
- c. Establish central funding for approved commissioning initiatives with short paybacks.

2.5.6 Description of End State

All facilities of sufficient size and consumption profile will be metered, with major installations making extensive use of central UMCS to assist energy management decisions.

2.5.7 Metrics of Success

- a. All appropriate buildings are metered in accordance with the EPAct 2005.
- b. All major installations have central UMCS connected to all of their highest energy use buildings.

2.5.8 Milestones (actions by FY)

Policy requiring metering and UMCS in all new construction issued by HQDA	FY 2007
Strategy developed by HQDA, and policy issued for metering existing facilities.	FY 2008
All existing facilities metered per the EPAct 2005 guidelines	FY 2012

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.6 Action #6: Minimize the impact of fuel cost and availability at installations.

The volatility of liquid fuels and natural gas has caused considerable difficulty in budgeting and paying for the continued upward price trend of these fuels. Installations with agreements to purchase short-term or spot-market supplies of natural gas are faced with rapidly increasing natural gas costs.

Electricity prices (rates) are much less volatile and have been historically less severe than natural gas. Even though electricity is increasingly being generated from natural gas fired combustion turbines, most utilities serving installations have a mix of generating resources (coal, nuclear, hydro, natural gas, wind, etc.) that somewhat dampens the impact of increased natural gas prices due to the stability of the other fuels in the generation mix.

2.6.1 Approaches to Meet Action and Priorities

The short-term (S), mid-term (M) and long-term (L) approaches to meet these actions are described below.

- a. Develop guidelines and identify technologies that can help mitigate price volatility. (S) The Army will develop guidelines and methods for installations to evaluate an installation for applications of technologies to help mitigate fuel price volatility. The guidelines will include options for procuring long-term alternative fuel contracts as well as identify appropriate technologies.
- b. Maximize the use of existing and new technologies that offer fuel flexibility (S) The Army will identify and evaluate the most appropriate and cost-effective applications for proven fuel-flexible or dual-fuel technologies for buildings and facilities. These will be evaluated at the time of new construction, major renovation or repair/replacement projects. Examples of these technologies include, but are not limited to:
 - Dual gas-fired and electric cooling (gas-engine driven air conditioners)
 - Natural gas/propane-air mixing stations
 - Solar or natural gas or electric water heating.
- c. Evaluate cost-effectiveness of high performance electric technologies that mitigate the potential volatility of direct-combustion fuels such as natural gas and propane. (S) The Army will identify and evaluate proven highly efficient and cost-effective electric technologies that can provide the same level of service (heat, cool, hot water) as cost-effectively as gas technologies. These electric technologies are not subject to the volatility of natural gas, fuel oil and propane and have an added benefit of not producing greenhouse gases on-site. Examples of these technologies include, but are not limited to:
 - High performance air-source heat pumps of up to 18 SEER
 - Geo-exchange heat pumps (ground source/ground water source) of up to 17 SEER.
 - Heat pump water heaters
 - Distributed electric boilers
 - Microwave/flash cooking and curing
 - Point of use electric water heaters
 - Electric ovens, stoves, etc., used in dining facilities and government owned housing.
- d. Evaluate and implement technologies that minimize electric demand (S)

The Army will identify and evaluate proven and cost-effective electric demand reduction technologies that will mitigate the current and expected increases in electric demand prices. The Army will identify where these technologies have been successfully applied. Examples of these technologies include, but are not limited to:

 - Refrigerant—based ice storage
 - Central cooling cool storage
 - On-site generation including use of renewable fuels
 - Highly efficient evaporative cooling
 - Low-temperature waste heat A/C
- e. Install a significant amount (10-15%) of primary and back-up renewable cost-effective technologies in addition to that already installed. Seek and take advantage of third-party funding and financing for these

technologies (M). The Army will accelerate the installation of primary and back-up cost-effective proven renewable technologies, focusing primarily on those that substitute for the most volatile fuels. Due to the highly regional and localized nature of renewable resources, the Army will work in concert with other DOD and Federal agencies to identify the most appropriate installations to apply these technologies. Examples of these technologies include, but are not limited to:

- PV/solar water heating (domestic and swimming pools)
- PV/solar lighting (interior and exterior)
- Biomass fuel from landfills and agricultural waste
- Wind energy
- PV/solar pumping

f. Work in cooperation with other Federal agencies to promote and procure long-term alternative fuel resources such as gas, liquid fuels and hydrogen from coal gasification and biomass fuel. (M) The Army, working in cooperation with other DOD agencies and the Defense Energy Support Center, will establish a plan to identify and procure alternative fuels. These fuels will be primarily coal-based and biomass-based. Coal based fuels would be generated through methane-gas extraction from coalfield or from processes that are clean (that is, “green” coal) and that sequester the carbon at the time of production. Biomass-based fuels would likely be more localized such as landfill gas or a cooperative effort with the local community to use agricultural or processing waste to produce ethanol and/or methane.

2.6.2 Technologies and Tools Required

The Army will use proven technologies and rely on the public and private sector R&D community for development of new technologies. Technologies and tools required include but are not limited to:

- a. Mature and proven refrigerant-based ice storage technology
- b. Lower-cost and more efficient solar/PV and other renewable technologies
- c. Mature and reliable technology for coal gasification
- d. Decision-making tool and/or process for installations to identify alternative strategies to maximize fuel flexibility and minimize risks of volatility.

2.6.3 Policies, Management and Institutional Issues

EPAct 2005

The requirements of the EPAct 2005 on this Action is Section 401 “Clean Coal Power Initiative” At least 70% of the allocated funds for the clean coal power initiative will be used to fund projects on coal-based gasification technologies, including-

- a. gasification combined cycle
- b. gasification fuel cells and turbine combined cycle
- c. gasification co-production
- d. hybrid gasification and combustion
- e. other advanced coal based technologies capable of producing a concentrated stream of carbon dioxide

There are no other significant policies, management or institutional issues that need to be addressed for this Action. The goal in Executive Order 13123 (Greening the Government through Efficient Energy Management) of reducing fossil fuel use and the chronic issue of reduced utilities and operations budgets will be addressed by implementing the recommendations of this Action.

The Army will work with other agencies to insure that there is continued legislation, authorization and guidelines for use of all sources of alternative financing—including ESPC, UESC and Federal Agencies such as the Bonneville Power Administration (BPA.) The technology focus and financing structure of alternative financing programs needs to consider the dollar savings of projects as well as the energy/demand savings, and unique technology and economics of renewable technologies.

The Army will also seek out and take maximum advantage of any utility, regional, state, or Federal programs for technology development, demonstration, or incentives, or for supply of alternative fuels.

2.6.4 Specific Projects to Meet Action

The following initiatives will be taken to meet this Action.

- a. The Army will develop guidance for an installation-level Strategy. The guidance will include the current and future options for mitigating fuel price volatility. The Army will make a decision on the appropriateness of including this Strategy as a part of the installation Energy Security Plan.
- b. The Army will undertake a program to identify those installations that: 1) are particularly vulnerable to the price volatility of natural gas; 2) are in areas with chronic high natural gas prices but relatively low and historically stable electricity prices (on delivered Btu basis); and 3) have high summer electricity demand but relatively stable summer natural gas prices. Each of the installations surveyed will be screened and prioritized for development of a Strategy to mitigate fuel price volatility. The format and content of the Strategy will be developed by OACSIM and included as an Appendix in the installation Energy Security Plan.
- c. The Army will identify and seek out opportunities to participate with the public and/or private sector in demonstration programs for commercially available but underused technologies that hold promise for mitigating fuel price volatility.
- d. The Army will work with DESC, DOD and other Federal agencies to identify sources of future supplies of alternative fuels such as coal gas and other coal-derived liquid and gaseous fuels. The Army will consider entering into long-term contracts for these fuels.

2.6.5 Funding Strategies and Sources

The following are the funding/financing strategies and sources

- a. OACSIM will establish a budget for selected evaluations and/or demonstrations of approaches and technologies for cost-effectively minimizing fuel price volatility.
- b. Alternative financing will be the source for the majority of projects implemented

2.6.6 Description of End State

Installations make fuel source and technology decisions to minimize impact of fuel price increases.

2.6.7 Metrics of Success

The following are quantifiable metrics for achieving success in this Action.

- a. Each installation includes a strategy in their installation energy plan for using energy sources with low price volatility.
- b. Installations' higher headquarters offices will verify price volatility is a consideration in fuel source and technology decisions in facility projects managed by the installation.
- c. Army average energy costs increase at a slower rate than the national average.

2.6.8 Milestones (actions by FY)

Guidance developed by OACSIM for how to develop an installations-level strategy for minimizing fuel price volatility	FY 2007
OACSIM begins dialog with DESC and other DOD and Federal agencies about securing sources of alternative fuel sources	FY 2007
Tool(s) developed to assist sites in making decisions. Thorough Armywide technical evaluation of technical and institutional issues of alternative fuel supplies that meet objective.	FY 2007
OACSIM joins with other DOD and Federal agencies to identify and enter into demonstration projects	FY 2008
Annually review methodology and strategy for minimize impact of price increases	FY 2009-25

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.7 Action #7: Establish an Army utility (electric, natural gas and other fuels) source evaluation program that selects a cost-effective and secure energy source option that includes alternative sources.

2.7.1 Approaches to Meet Actions and Priorities (S, M, L)

Short Term

- a. Develop a comprehensive utility source evaluation process that would allow evaluation of existing utility supply costs and alternative sources to assure lowest cost consistent with adequate supply assurance, security, and minimal price volatility exposure.
- b. Prioritize evaluation implementation and program funds, beginning in POM 08 to provide necessary resources at all levels to establish a continual evaluation process.

Medium- to Long-Term

- a. Continually reevaluate energy supply opportunities and rates in light of changing installation requirements, developing technologies, and source opportunities to assure all major Army installations are taking advantage of the lowest cost alternative utility source consistent with supply assurance, security and minimal price volatility exposure.
- b. Refine evaluation process to reflect lessons learned and changing constraints and technologies.

2.7.2 Technologies and Tools Required

- a. A comprehensive utility source evaluation process that would allow evaluation of existing utility supply costs and alternative sources to assure lowest cost consistent with adequate supply assurance, security, and minimal price volatility exposure.
- b. Resources (either in-house or contract expertise) necessary to apply the process appropriately to meet the end state timing goals.

2.7.3 Policies, Management, and Institutional Issues

- a. Army leadership must understand and appreciate the energy security and cost savings benefits of providing necessary resources to accomplish utility supply evaluation process.
- b. Establish a joint DOD services and/or Federal agency utility source acquisition process.
- c. Establish organizational responsibilities within the Army for who funds and manages rate review and source evaluation.

2.7.4 Specific Projects to Meet Action

- a. Establishment of installation utility source evaluation process guide that includes existing supply rate evaluation—as well as evaluation of the cost-effectiveness, reliability, and security of alternative supply options, including on-site generation and renewable energy sources.
- b. Provision of necessary resources to allow application of the utility source evaluation process to meet the proposed end state schedule, though either in-house and/or private sector personnel.
- c. Commitment of necessary resources to accomplish installation review schedule.

2.7.5 Funding Strategies and Sources

Identify O&M funds necessary to establish the evaluation process and resource the needed continuing evaluation teams.

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2.7.6 Description of End State

Establishment and implementation of a utility source evaluation program process that assures that all major installations receive a comprehensive utility source review biennially (occurring every second year) and all other installations not less frequent than once every four years.

2.7.7 Metrics of Success

- a. Establishment of the evaluation process
- b. Accomplishment of initial evaluation process at all major installations.
- c. Accomplishment of all initial evaluations.
- d. Identification of resultant cost savings and supply security improvements from initial evaluations.
- e. Regular installation evaluations accomplished on the recommended schedule

2.7.8 Milestones (actions by FY)

Constitute an Advisory Team to prioritize evaluation activities, develop an objective action plan, and initiate evaluation process	FY 2007
Refine evaluation process	FY 2007
Initiate installation process at highest priority installations	FY 2008
Identify cost savings and supply security improvements from initial valuations	FY 2009
Refine evaluation process and continual execution of on-going process	FY 2010-20

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.8 Action #8: Implement authorization that allows monies to be retained at the installation level based on utility savings—to be used for utility projects.

2.8.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Research current policies (S)
- b. Provide memorandum and coordinate with appropriate office (S)
- c. Quality control/follow-up with initial pilot sites. (M)

2.8.2 Technologies and Tools Required

No special technologies or tools required for this administrative action.

2.8.3 Policies, Management, and Institutional Issues

EPAct 2005

The requirements of the EPAct 2005 that related to this action are found in Section 102 "Energy Management Requirements." This section allows retention of unexpended funds appropriated for energy, water and wastewater expenditures or from revenue generated by sale of electricity from alternate energy and cogeneration production facilities. Retained funds may be used for energy efficiency, water conservation or unconventional and renewable energy resources projects.

Per 10 U.S.C. 2865, funds appropriated for utilities for a fiscal year and unobligated as a result of energy cost savings shall remain available for obligation until expended; and one-half of the amount shall be used for implementation of additional energy conservation measures. Use of the remainder is at the discretion of the head of the department or agency that realized the savings.

Savings from decreased consumption shall cover energy projects, training of employees, management of cost reduction program (for example, energy hotlines, advertisement items, promotional materials, etc), and any other eligible costs.

2.8.4 Specific Projects to Meet Action

Define policies that will comply with the National Energy Conservation Policy Act (42 U.S.C. 8256), which authorizes retention of savings, and the EPAct 2005 which further defines implementation requirements.

Coordinate with OSD and Comptroller for implementation of policy.

2.8.5 Funding Strategies and Sources

Funding for this effort is not required. Only administrative changes (revision of policies) are required to allow retention of savings at the organization level in which the savings were created.

2.8.6 Description of End State

Available and qualifying funds provide benefit to installations attributed to saving energy and reducing energy costs to a level below programmed utility funding levels. Determine to be successful when the Retention of Savings is in compliance with the EPAct 2005 and Executive Order 13123 which grants statutory authority to retain a portion of savings generated from efficient energy and water management practices and keep those savings at the facility or site where the savings occur to provide greater incentive for that facility and its site managers to undertake more energy management initiatives, invest in renewable energy systems, and purchase electricity from renewable energy sources

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2.8.7 Metrics of Success

- a. Increased number of installations making use of this authority.
- b. Percent of installations' utility budgets retained and spent on energy initiatives.

2.8.8 Milestones (actions by FY)

Develop and issue policy for savings retention	FY 2007
Implement policy	FY 2007-25
Installation(s) successfully taking advantage of this authority	FY 2008 (Oct 2007)

Initiative #2: Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effective energy efficiency, and support the Army's environmental objectives.

2.9 Action #9: Increase performance verification in the use of alternative financing and available appropriated funds.

2.9.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Increase training on the use of the performance measurement and verification procedures. (S).
- b. Require well defined and thorough review of measurement verification plans in alternative financed project proposals. (S)
- c. Validate performance of a sample of alternatively financed and ECIP projects. (M)

2.9.2 Technologies and Tools Required

DOE has developed measurement and verification (M&V) guidance and published them in their FEMP M&V Guidelines. The document is based on and fully compatible with the International Performance Measurement and Verification Protocol.

2.9.3 Policies, Management, and Institutional Issues

Policies must support use of alternative financing and be periodically reviewed and updated to improve implementation processes and execution schedules. Policies supporting alternative financing must incorporate consideration of operation and maintenance programs to potential alternative financing opportunities.

2.9.4 Specific Projects to Meet Action

- a. Review current training curriculum to determine adequacy of training to energy managers on alternatively financed energy projects.
- b. Require ESPC projects to use Project Facilitators, trained to DOE standards, to verify that proposed M&V plans are adequate to validate savings.
- c. Provide resources and capabilities for review and acceptance of initial annual reconciliation reports.
- d. Review O&M renovation programs for ESPC potential.
- e. Validate project performance and M&V plan adequacy at a sample of alternatively financed projects.
- f. Issue follow-up guidance and revalidate and/or validate another sample of alternatively financed projects as needed.

2.9.5 Funding Strategies and Sources

Typically, appropriated funds are used for training to support installation energy management programs and to validate performance of ESPC projects. As an alternative, a portion of the first year utility cost avoidance from alternative financed projects can be set aside to cover the cost of reviewing and validating the initial savings reconciliation report.

2.9.6 Description of End State

Performance of all alternatively financed energy projects will be validated that the utility and O&M cost avoidance is measured and verified.

2.9.7 Metrics of Success

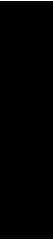
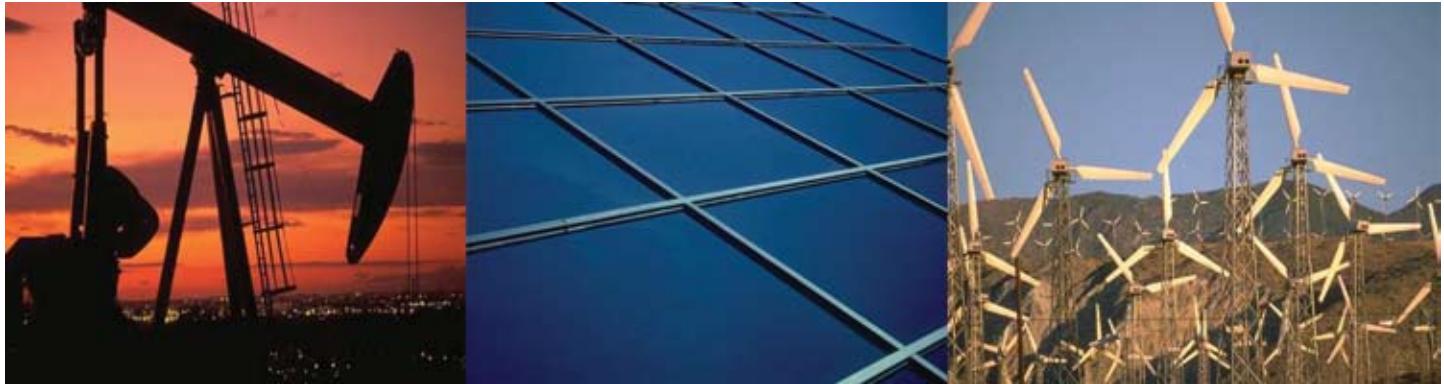
Decrease in the number of alternatively financed projects found with deficient M&V plans with which project performance and savings cannot be validated.

2.9.8 Milestones (actions by FY)

Issue updated guidance on validating performance of alternatively financed projects	FY 2007
Validate performance of three alternatively financed projects and issue revised guidance as needed.	FY 2007 FY 2012 FY 2017 FY 2022

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1 Aug 06



Tab Number 4

Initiative Number 3

**Reduce Dependence
on Fossil Fuels**



Initiative #3: Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy, reducing waste, increasing efficiencies, and improving environmental benefits.

Action	Page
3.1: Substitute renewable resources for purchases of electricity from fossil fuel sources when life-cycle cost-effective	61
3.2 Develop all cost-effective on-site renewable power generation consistent with mission requirements	66
3.3: Modernize and sustain central energy systems to reduce fossil fuel consumption	73
3.4: Reduce on-site fossil fuel use for building space heating and domestic hot water	76
3.5: Reduce fossil fuel usage in non-tactical vehicles (NTV)	79

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Initiative #3: Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy, reducing waste, increasing efficiencies, and improving environmental benefits.***3.1 Action #1: Substitute renewable resources for purchases of electricity from fossil fuel sources when life-cycle cost-effective.*****3.1.1 Approaches to Meet Actions and Priorities (S, M, L)**

Procure renewable resources from utilities, marketers, Federal power administrations, and third party producers, using long-term contracts for energy from new renewable resources using PMA authorities, the Economy Act, existing utility tariffs, utility contracts, ESPC, UESC, and authority under 10 USC 2394.

Actions during the next 5 to 10 years will require procurement of renewable energy in “deregulated” utility areas where retail competition is allowed under state law pursuant to section 8093 of Public Law 100-102 (which prohibits energy procurements that are at odds with state utility law, such as by procuring energy as a wholesale rather than retail customer). Differences in state deregulation rules require different procurement approaches. Different procurement agents may be better suited for procurements in different areas, so a “one size fits all” procurement recommendation is inappropriate at this time. As a result, energy procurements in deregulated areas are already underway using DESC, GSA, and the BPA and WAPA Federal power marketing administrations as procurement agents. Renewable energy resources will also be procured from third-party suppliers of bio-gas and power from biomass fuels through the above agents and through public-private partnerships where possible. Installations will pool renewable energy requirements and collaborate with project developers, utilities and state agencies, regulatory and legislative bodies to stimulate development of local renewable resources where local utilities and/or energy markets have not developed. Because these actions may take years to execute, renewable energy certificate (REC) procurements will be executed in the interim to comply with Federal renewable energy requirements. (S)

Actions during the next 11 to 15 years will require execution of energy procurements in areas opening to retail competition, such as customers of BPA and TVA and potentially California, and to capitalize on collaborative market development with utilities and developers in the Plains states, Gulf states, and potentially southern states. (M)

In the long-term, procurements will be expanded to areas where rising energy costs will make renewables life-cycle cost-effective using competitive long-term contracts where possible, and utility collaborations and public-private partnerships where retail markets are not open to competition. (L)

3.1.2 Technologies and Tools Required

Training of appropriate procurement personnel, including energy managers, contracts and legal support staff, public works personnel, and command staff on this objective and available procurement mechanisms.

3.1.3 Policies, Management, and Institutional Issues**EPAct 2005**

Section 203 “Federal Purchase Requirement” of the EPAct 2005 sets out goals for renewable energy purchase by the Federal sector.

Specifically, the President, acting through the Secretary, shall seek to ensure that, to the extent economically feasible and technically practicable, of the total amount of electric energy the Federal government consumes during any fiscal year, the following amounts shall be renewable energy:

- a. Not less than 3% in FY 2007 through FY 2009
- b. Not less than 5% in FY 2010 through FY 2012
- c. Not less than 7.5% in FY 2013 and each fiscal year thereafter

If the renewable energy is produced 1) on site, 2) on Federal lands, or 3) produced on Indian land and is used by the installation, the amount produced is doubled for purposes of compliance with these goals. Renewable energy is defined in Section 203 of the EPAct 2005

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The developers of renewable electrical energy may structure purchase agreements to differentiate between the commodity produced and the value of “renewable energy certificates” (REC) accompanying the commodity. RECs are considered to be the environmental attributes of the renewable energy produced, calculated as the incremental cost of developing or producing the renewable electrical power. Some regulatory agencies track utility providers’ compliance with meeting local renewable energy generation requirements with RECs, and in some locations RECs can have substantial value in avoiding financial penalties levied by regulatory agencies for not meeting state mandated requirements supporting production of electrical energy from renewable sources. In these areas the cost of including the REC in the total cost of the commodity may make purchase of renewable electrical energy uneconomical.

The DOE is developing guidance for tracking progress toward the EPAct 2005 renewable energy goal that will likely exclude electrical energy generated at “facilitated projects” from counting toward renewable energy goals. Facilitated projects are privately funded projects on Federal land, where the developer retains ownership and responsibility of the equipment installed and facilities constructed. The developer may have interest in retaining the RECs for their resale value or for use in meeting state renewable requirements, in order to improve the economics of the project and allow them quicker recovery of their investment.

Section 204, “Use of Photovoltaic Energy in Public Buildings” directs the General Services Administration (GSA) to establish a photovoltaic energy commercialization program for the procurement and installation of photovoltaic solar electric systems for electric production in new and existing public buildings. The purpose of this program is to accelerate the growth of a commercially viable photovoltaic industry; reduce the fossil fuel consumption and costs of the Federal Government; attain the goal of installing solar energy systems in 20,000 Federal buildings by 2010, as contained in the Federal Government’s Million Solar Roof Initiative of 1997 (see <http://www.millionsolarroofs.org/>); stimulate the general use within the Federal Government of life-cycle costing and innovative procurement methods; and develop program performance data to support policy decisions on future incentive programs with respect to energy.

Management and Institutional Issues

The Army will strive to meet the Federal renewable energy goals established by the EPAct 2005. Entering into long-term (up to 30 year) energy supply contracts will help to achieve this goal. Long-term contracts will improve life-cycle cost economics, such contracts may have higher near-term costs compared to conventional power supply options, although the cost will be the same or lower on a life-cycle basis. Both long-term contracting authority and life-cycle cost justification are necessary to execute these actions because renewable power price premiums over conventional power costs are minimized by longer contract terms, and near-term price premiums are offset by out-year savings using life-cycle cost calculations. 10 USC 2394 appears to provide authority for long-term (up to 30 years) purchases of renewable power (10 USC 8689 for geothermal power). Accordingly, clear guidelines on its application will need to be provided as well as that for appropriate application of life-cycle cost calculations to comply with Congressional and Department life-cycle cost directives.

These assumptions require verification. Lacking that, new authorities and policies may be required. Policy alternatives that would otherwise facilitate these actions include repeal of section 8093 of Public Law 100-102 and conversion of DOD installations from retail to wholesale electric customer status through legislative action. Both appear unnecessary if 10 USC 2394 can be used. Wholesale status would greatly accelerate DOD purchases of renewable power and potentially enhance facility energy security; however, conversion from retail to wholesale status would likely be opposed by the utility providers.

Policy changes that are recommended include changes to ECIP payback and utility UESC contract terms from the current 10-years to terms equal to the life of the renewable resource, consistent with life-cycle costing methodology. This will allow utilities to develop renewable resources on behalf of Army customers without use of 10 USC 2394. Further, 10 USC 2394 was developed and has been primarily used to contract directly with energy project developers. Changes in Federal and state electric utility regulations have created competitive markets and

power marketers that broker relations between developers and power purchasers. Modifications of 10 USC 2394 may be necessary to extend coverage to power marketers consistent with current utility laws and regulations.

Finally, progress in deregulated energy supply markets make current third-party financing vehicles, such as ESPC, inadequate for many on-site renewable energy projects. Many on-site renewable energy projects are more economic if they are structured as energy purchase contracts or public-private partnerships where ownership of the energy producing assets remains with a private sector party for tax and other incentive purposes. A new third-party financing vehicle for renewable energy supplies to Army facilities is needed. This vehicle should be based on and consistent with current utility laws and regulations for independent power producers (IPPs), a specific legal entity in the deregulated power industry.

The following management issues will need to be addressed to execute all of the recommended actions (some, but not all, procurements can be executed without resolution of these issues):

- a. Streamlining contract approval using 10 USC 2394. This authority requires Secretary of Defense approval and Congressional notification, although Service Secretaries have been delegated substantive approval authority. Power purchase contracts are sensitive to hourly fluctuations in energy markets and, therefore, must be signed as soon as possible. This may require an up-front, pre-approval process based on expected prices.
- b. Central funding of initial price premiums over conventional power prices. Renewable power often costs more than conventional power because renewable power requires high up-front capital investments which are offset by low operating and no fuel costs. Higher initial power costs increase facility operating costs.
- c. Development of Army capabilities and technology, industry, and market knowledge to execute renewable contracts. Knowledge of renewable energy technologies and resources are critical to smart procurement of renewables on long-term contracts, as is knowledge and expertise dealing with various procurement agents, especially Federal power marketing administrations. This knowledge is not wide-spread in the Army or even other Federal agencies and very limited capability exists within DOD.
- d. Development of joint-service strategies for renewable power purchasing and development of on-site resources using purchase contracts. Economies of scale may be available for renewable power purchases that require coordination and collaboration among DOD components. Joint basing reinforces this need. This coordination could be managed by DESC, although as the largest electricity user, the Army has more of a vested interest in timely and effective execution that may make it a more logical coordinator, at least in many regions.
- e. Finally, management will need to identify funds for this strategy and a process for management of strategy execution. Because execution of this strategy is expected to be life-cycle cost-effective, near term funding requirements will be offset by future savings. In addition, long-term contracts will reduce the administrative costs of power procurement over the long run by increasing the period between re-contracting for these services.

The primary institutional issue is training on the new approach to power procurement including:

- a. Status of renewable energy technologies, resources, and local markets
- b. Preference for renewable electricity when life-cycle cost-effective
- c. Preference for joint-service procurements when economies of scale are possible
- d. Use of long-term contracts
- e. Use of long-term contracting authorities
- f. Use of non-base (and potentially non-Army) procurement personnel to execute contracts
- g. Application of life-cycle cost-effectiveness criteria to renewable purchases
- h. Use of new third-party financing approaches for on-site renewable projects (if any)

3.1.4 Specific Projects to Meet Action

The Army will participate in joint Service renewable power and REC procurements. The specific procurements identified in the Renewable Resource Assessment Implementation Plan are as follows:

- a. Near-term procurements:
 - New Mexico
 - California Central Valley
 - Texas
 - Pennsylvania, New Jersey, Maryland purchase through DESC (at least 2 planned)

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- Florida biomass
- New Jersey biomass NE United States purchase through DESC
- Carolina biomass
- Alaska
- b. Mid-term procurements
 - Florida wind purchase
 - Colorado wind purchase
 - Arizona
 - California if Direct Access allowed (after 2011)
 - BPA and TVA customers (after 2010)
 - Plains and Gulf states
- c. Long-term procurements
 - North-central manufacturing-belt states
 - Virginia
 - Western United States if Direct Access allowed
 - Southeastern wind

In each case, the Army will collaborate with other services in specific regional purchases of renewable energy using various contracting mechanisms (as appropriate), including:

- a. Utility contracts
- b. Procurements by Federal power marketing authorities on behalf of Army installations
- c. Contracts under 10 USC 2394 executed by DESC and others
- d. Third-party financing of on and near-base projects using current authorities
- e. Use of new third-party financing vehicles specific to on and near base renewable projects based on long-term purchase contracts

Each of the initial purchases shall be documented as a case study to identify its suitability as a procurement approach, to facilitate streamlining of the procurement process, and to educate other staff and facilities.

The Army will also collaborate with other services on REC purchases where renewable power purchases are not available or will not be concluded in time to satisfy Federal renewable energy requirements, such as recently completed efforts by the Air Force and DESC to purchase RECs to satisfy the requirement of EO 13123 for purchases of 2.5% of electricity from renewable sources.

3.1.5 Funding Strategies and Sources

This activity is expected to be budget neutral to positive (saves money) over the mid- to long-term. Higher prices on long-term contracts are expected to average three-tenths of a cent per kilowatt hour in the early years of purchase contracts. The DOD Renewables Assessment Implementation Plan proposed renewable energy purchase targets for 2020 based on three different levels of effort. The Army share of the maximum target is approximately 4,000,000 MWh, or roughly 50% of the Army's current electricity purchases. Initially a premium would be paid in the early years of long-term contracts. As conventional power prices increase, this premium would be offset and eventually the Army electricity budget would be reduced resulting in out-year savings. Additional savings would result from less frequent power procurements due to the longer contract terms for renewable power purchases.

The budget for higher initial costs, although modest, would have to be covered from additional appropriations or reallocation of existing utility or other O&M funds. Contracts for the full 4,000,000 MWh cannot be placed at once and will instead, be placed over a multi-year period (well into the next decade), minimizing the impact on near-term budgets.

An alternative approach would be to structure purchase contracts with no initial premium (or potentially a price discount) and to allow prices to escalate over time. This approach could reduce near-term budget impacts, but is likely to reduce or eliminate out-year savings. Nevertheless, either approach results in a significant increase in Army use of renewable energy.

The DOD Renewables Assessment also identified potential for on-site renewable power production, of which the Army's portion could be up to 740,000 MWh annually. These projects are expected to be life-cycle cost-effective and therefore, pay for themselves. ECIP funding for the number and scale of projects identified is inadequate and may not be consistent with the least-cost development strategy or the Army's privatization policies. Therefore, most of these projects are expected to be financed through public-private partnerships based on power sales contracts, essentially power purchases. On-site project activities are covered under Action 2, but enabling financing will be through power purchases.

3.1.6 Description of End State

Up to 50% of Army electricity is purchased from renewable resources by FY 2030. This is equal to approximately 4,000,000 MWh annually at current electricity consumption levels. Additionally, up to 15% of Army electricity will be supplied by on and/or near base renewable projects by FY 2030, much of which will be financed through power purchase contracts.

3.1.7 Metrics of Success

Renewable power purchases will meet or exceed the following levels by the specified dates:

10% by FY 2010

30% by FY 2015

50% by FY 2030

3.1.8 Milestones (actions by FY)

Contract for at least 7% of Army electricity (approx 560,000 MWh) from renewable resources annually	FY 2008
Contract for at least 10% of Army electricity (approx 800,000 MWh) from renewable resources annually	FY 2010
Contract for at least 30% of Army electricity (approx 2,400,000 MWh) from renewable resources annually	FY 2015
Contract for at least 40% of Army electricity (approx 3,200,000 MWh) from renewable resources annually	FY 2025
Contract for at least 50% of Army electricity (approx 4,000,000 MWh) from renewable resources annually	FY 2030

Electricity purchases from current electricity providers will also be displaced by power produced from on- and near-base renewable resources much of which will be secured through power purchase contracts from on- and near-base project owners as discussed further in this section.

Initiative #3: Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy, reducing waste, increasing efficiencies, and improving environmental benefits.

3.2 Action #2: Develop all cost-effective on-site renewable generation consistent with mission requirements.

3.2.1 Approaches to Meet Actions and Priorities (S, M, L)

The DOD Renewables Assessment identified potential for on-site and near-base renewable power production and estimated the potential for renewable energy production at Army sites of 740,000 MWh annually. These projects are expected to be life-cycle cost-effective and therefore, pay for themselves. ECIP funding for the number and scale of on-base projects identified is inadequate and may not be consistent with the least-cost development strategy or the Army's privatization policies. Consequently, most of the larger projects are expected to be financed through public-private partnerships based on power sales contracts, essentially power purchases. Power purchasing activities are covered under Action 1, which describes how financing for these projects will be enabled through power purchase contracts.

Short-Term Actions (S)

Representatives from OACSIM, HQIMA and the IMA regions will comprise a Renewal Project Implementation Team, whose goal is to cost-effectively implement the DOD Renewables Assessment. The team will make use of technical services available from ERDC/CERL, FEMP and DOE national laboratories as needed.

An OACSIM and/or IMA team member will assure coordination and policy compliance among the other members of the team. The Team will provide technical recommendations and evaluations of proposed renewable energy projects. The Team will also help installations develop their renewable energy project proposals, advise what funding strategies to consider, participate in review of developer/contractor solicitations, and if available serve on source selection boards. The Team will request contracting support from Huntsville District and DESC representatives as needed.

The Army will participate with other services in the Tri-Service Renewable Energy Committee (TREC). The Team will coordinate and partner through the TREC with OSD, other DOD Services, other Federal agencies, state/local government and the private sector as needed to streamline projects and reduce costs.

Public-private partnerships are a likely scenario for large projects. Such partnerships may improve life-cycle cost-effectiveness since private companies may be able to take advantage of various tax incentives (investment tax credit, property tax exemption, production tax credit, accelerated depreciation, etc). Other considerations include energy security issues, back-up power needs, whether the electricity will be used on-site, offsetting retail rates, or sold to outside entities at a wholesale power rate. The team lead will develop a draft project implementation timeline.

A table with potential sites identified through the RA report is included as an appendix. The photovoltaic (PV) opportunities are subject to the availability of private sector partner/developers and/or state and utility incentives since PV project costs of an estimated \$7 million per installed MW would quickly deplete the ECIP budget. Public entities are better able to take advantage of tax incentives—thus reducing project cost.

The expected short-term projects based on DOD Renewables Assessment report are as follows:

- a. Develop one large wind project.
- b. Develop 2 small wind projects, probably using ECIP funding

The Team will develop a project brief fact sheet for each project. This fact sheet will be sent to the base and meetings will be set up with site decision-makers, the energy manager, sustainability/environmental staff and other appropriate staff to discuss the recommended project(s) and determine project viability based on any potential

mission constraints. The project implementation timeline will be modified based on site interaction. The Team will facilitate project implementation.

The Team will explore opportunities to participate in the OSD/FEMP renewable ESPC initiative¹. The Team will consolidate and combine projects where possible to result in a streamlined, large volume buy—for the renewable hardware and/or turnkey projects. This will help to minimize project management and other costs. Similar to a regional ESPC project, the designated ESCO can do the engineering and feasibility studies as part of the detailed energy survey once all of the best sites are identified. Another potential ESPC approach is to bundle renewable energy with energy efficiency work for one large project. This may make the most sense for PV projects, to improve overall project cost-effectiveness. Solar water heating and solar walls will probably be cost-effective as stand-alone projects.

The Team will also determine methods to reduce solar project costs. The Army will consider partnering with other services for large purchases of solar equipment and/or will utilize lessons learned from the Air Force purchase that will help the Army replicate the process at their sites. There are cost reduction opportunities in several different areas:

- a. Solar energy cost (cost/kWh is a function of module efficiency, material cost and manufacturing cost)
- b. Balance-of-system (BOS) costs. Note that module area effects cost since the rack and foundation costs increase with larger modules, thus higher efficiency solar panels may be the lowest cost alternative since they provide higher energy output per unit area.
- c. Installation cost
- d. Procurement cost (for example, if a general contractor is used, the subcontract cost will include additional overhead/profit costs)

The Team will evaluate demonstration and pilot project ideas for new technologies and advanced concepts such as renewable hydrogen/fuel cells, microgrids and/or a Sustainable Renewable Communities pilot. The Team will explore small wind turbines and vertical axis wind turbine opportunities since they reduce or eliminate mission conflict issues, require less space and can be sited in areas closer to electrical infrastructure (along roads, in residential areas, etc.). The Team will also collaborate with DOE's geothermal program to demonstrate technologies for utilization of geopressure resources.

The Team will coordinate with each site to ensure renewables (including passive solar) are considered in any energy/new construction project. This will involve coordination with Initiatives 1 and 2. This coordination should occur throughout the medium- and long-term actions as well.

Medium-Term Actions (M)

Medium term actions include:

- a. Continue project implementation. This involves:
 - Develop multiple mid to large scale wind projects
 - Drill exploratory well at one location
 - Develop at least one geothermal project
 - Develop several small wind projects
- b. Continue to identify, validate and test the full range of emerging renewable technologies. Implement technology demonstration projects as appropriate.
- c. Continue coordination with DOD and DOE laboratories and other entities on research needs.

¹ There are several tech specific ESPC's, including PV and parabolic trough. See
http://www.eere.energy.gov/femp/financing/superespces_solar.cfm
http://www.eere.energy.gov/femp/financing/superespces_photovoltaics.cfm

Long-Term Actions (L)

Long-term actions include:

- a. Develop new implementation plan. This will likely include:
 - Develop multiple mid- to large-scale wind projects
 - Develop at least one geothermal project
 - Develop many small wind projects
- b. Undertake a technology and cost-effectiveness re-assessment of cost-effective projects.
- c. Continue coordination with DOD and DOE laboratories and other entities on research needs.

3.2.2 Technologies and Tools Required

Renewable technology expertise will be required in the following areas: wind, solar, geothermal, biomass, wave/tidal/ocean thermal hydrogen/fuel cell and incremental hydro. A variety of renewable assessment tools will be required. Some of the currently available tools:

- a. The solar software Excel spreadsheet that was developed for the DOD Renewables Assessment.
- b. NREL's DOD GIS Database²
<http://mapserve1.nrel.gov/website/L48MarineCorp/viewer.htm>.
- c. Other renewable assessment software such as the DOE Federal Renewable Energy Screening Assistant: FRESA (http://www.eere.energy.gov/femp/technologies/renewable_software.cfm), HOMER (<http://www.nrel.gov/homer/>), and others

3.2.3 Policies, Management, and Institutional Issues

EPAct 2005

The Army will require installations within each CONUS IMA region to collectively comply with the EPAct 2005 renewable goals as described in paragraph 3.1.3, subparagraphs a through c of this document. The Army will ensure that renewable ECM evaluation is incorporated into all ESPC and UESC projects, as well as all new construction projects.

Management and Institutional Issues

The Army will assess all projects based on life-cycle cost instead of just first cost. This is especially important for renewable projects since their costs are front-loaded, but they have the potential to provide significant long-term cost and other benefits. The Army will advocate for ECIP projects that are assessed based on life-cycle cost rather than simple payback and request OSD classify the projected economic life of renewable projects at 25 years for determination of savings to investment ratio when competing for ECIP funds.

The Army will evaluate methods to incorporate externalities into life-cycle costing. These externalities include actual emission market prices or emission cost estimation, energy security benefits, etc.

The Army will consider the use of other energy market price forecasts besides the Energy Information Administration as they evaluate long-term project cost-effectiveness.

The Army will require sites to pay the full cost of diesel delivered to their sites, including transportation (as opposed to just the DESC bulk diesel price).

Specific Projects to Meet Action

Section 3.2.1 describes specific projects to meet this Action. In addition to those in 3.2.1, the Army will develop pilot projects using an RFP for a third party provider to own, design, build, operate, and maintain the project. One project will be developed for electricity supply and one project for combined heat and power.

²The DOD GIS database currently utilizes 1999 Platts utility rates and 2001 NIST economic assumptions (present worth factor). A 25-year analysis period was used. This database can be updated with current Platts/NIST data. Incentives could also be added (or Army sites in states with best incentives can be analyzed first). It may make sense to combine information in the Database with the DOD Renewables Assessment solar tool to create one tool that combines the best aspects of both tools.

3.2.5 Funding Strategies and Sources

The on-site renewable projects are expected to be life-cycle cost-effective to justify implementation. Joint service partnerships may reduce costs. Assuming a 10¢/kWh electric rate, an estimated \$12.5 million/year will be offset in the short term and \$40 million/year will be saved in the mid-term through on-site generation projects. There are a variety of funding sources and contracting mechanisms that could be used for these projects. These include:

- a. Public-private partnerships tied to long-term power contracts (see Action 3.1), such as the Independent Energy Provider (IEP) concept.
- b. Appropriated funding such as MCA, ECIP, and OMA. Note that ECIP funding will be inadequate to meet the target end-state for on-site renewable projects.
- c. Special Congressional appropriations for demand reduction, other specific goals
- d. ESPC/UESC
- e. Bonneville Power Administration financing (BPA can do turnkey projects in their region, financing elsewhere)
- f. Enhanced Use Lease (EUL)
- g. 10 USC 2394 and/or 10 USC 8689
- h. State and utility renewable incentives. The Database of State Incentives for Renewable Energy (DSIRE) database (<http://www.dsireusa.org/>) includes helpful incentive and renewable policy information by state.
- i. DOD research organizations grants such the Defense Advanced Research Projects Agency (DARPA), Strategic Environmental Research and Development Program, (SERDP)/ Environmental Security Technology Certification Program (ESTCP), Benet Laboratories. SERDP Solicitations are in November and the ESTCP Call for Proposals is in January.
- j. Other outside funding/grant opportunities such as National Science Foundation, State Technologies Advancement Collaborative (STAC, <http://www.stacenergy.org>, although funding may not be available after 2005)
- k. Army Sustainability and/or environmental program funding.

3.2.6 Description of End State

All cost-effective renewable technologies have been developed on or near Army installations by FY 2030 (10-15% of total Army load).

3.2.7 Metrics of Success

On-site renewable projects that meet or exceed the following levels by the specified dates:

Short range: 1 to 5% of total electricity consumption by FY 2010

Mid range: 5 to 10% of total electricity consumption by FY 2015

Long range: 10 to 15% of total electricity consumption by FY 2030

These projects combined with the renewable electrical power purchases must meet the EPAct 2005 goals.

3.2.8 Milestones (actions by FY)

Renewable team formed. Short-term implementation plan developed that includes project, construction timeline, funding source, and contractual arrangement	FY 2007
Produce 105,000 MWh/year from on-site renewable projects	FY 2010
Determine need for reassessment based on changes in technology cost and performance	FY 2015
Produce 400,000 MWh/year (cumulative)	FY 2015
Conduct reassessment	FY 2015
Produce 450,000 MWh/year (cumulative)	FY 2020
Produce 650,000 MWh/year (cumulative)	FY 2025
Conduct reassessment	FY 2025
Produce 740,000 MWh/year (cumulative)	FY 2030

Army Sites with Wind and Solar Potential**Wind Potential**

<i>Installation</i>	<i>State</i>	<i>Max. MWh</i>
FORT RICHARDSON	AK	15
BLACK RAPIDS TRAINING SITE	AK	TBD
GERSTLE RVR ARTIC TEST	AK	TBD
GULKANA ARMY SITE	AK	TBD
FORT HUACHUCA	AZ	5
YUMA PROVING GROUND	AZ	1
NTC AND FORT IRWIN; CA	CA	30
NTC AND FORT IRWIN; CA own use	CA	3
FORT HUNTER LIGGETT	CA	TBD
FORT CARSON	CO	1.5
PINON CANYON	CO	1
JOHNSTON MTA CAMP DODGE	IA	TBD
JOLIET AAP ELWOOD	IL	3
JOLIET AAP KANKAKEE	IL	3
FORT RILEY	KS	20
KANSAS AAP	KS	30
ABERDEEN PROVING GROUND	MD	0.01
FORT LEONARD WOOD	MO	TBD
MILITARY OCEAN TML SUNNY POINT	NC	TBD
CORNHUSKER AAP	NE	TBD
NG CAMP ASHLAND MTA	NE	TBD
NG HASTINGS MTA	NE	TBD
NG MEAD MTA	NE	TBD
FORT BLISS AAA RANGES (Filmore Gap)	NM	1.5
WHITE SANDS MISSLE RANGE NM	NM	0.05
HAWTHORNE ARMY DEPOT	NV	1
WEST POINT MIL RESERVATION	NY	TBD
FORT SILL OK	OK	20
DUGWAY PROVING GROUND	UT	TBD
TOOELE ARMY DEPOT	UT	TBD
FORT STORY	VA	TBD
YAKIMA TRAINING CENTER	WA	40
BADGER AAP	WS	TBD
FORT MCCOY	WS	TBD
POTENTIAL (MW Installed Capacity)		175.06

Army Energy and Water Campaign Plan for Installations

Solar Potential

<i>Installation</i>	<i>State</i>	<i>Max Mwh</i>
FORT IRWIN	CA	91,112
PRESIDIO OF MONTEREY	CA	26,258
SIERRA ARMY DEPOT	CA	11,659
FORT HUNTER LIGGETT	CA	8,632
	POTENTIAL	137,661

Initiative #3: Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy, reducing waste, increasing efficiencies, and improving environmental benefits.

3.3 Action #3: Modernize and sustain central energy systems to reduce fossil fuel consumption

The Army has many aging central energy systems (central heating/cooling plants and distribution systems) that are not feasible for privatization. Many of these systems have exceeded their expected useful lives, and are threatening mission performance and readiness, increasing operation & maintenance costs, and could result in a catastrophic failure. In the Army IMA Southeast Region alone, it is estimated that 1.25 trillion Btu per year are lost in the central heating and cooling distribution systems. This costs the Army nearly \$7.5 million each year in excess energy costs. Extrapolating this to the entire Army, this wasted energy could be costing the Army \$40-50 million per year.

The Army Central Heat Plant Modernization program from FY 1998-2002 provided \$300 million to fix the most urgent central systems. The installations were prioritized largely on the basis of the Installation Status Report (ISR) condition, cost of service, and mission performance impacts. Most of the central heating plants and distribution systems were replaced with similar systems. A few installations decentralized the heating systems by installing individual boilers in the buildings. Since the end of this program little has been done to reduce the cost of service at the central heating/cooling plants as the economics of modernization using alternative financing alone is generally not attractive.

3.3.1 Approaches to Meet Actions and Priorities (S, M, L)

In order to insure safe, reliable systems that fully support mission requirements, and reduce operating and maintenance costs, OACSIM will establish a systematic approach for Army central energy systems (CES) modernization. This approach will:

- a. Insure that the installations consider a broad set of technical alternatives (replacement, decentralization, co-generation, thermal storage, etc.)
- b. Select from the alternatives based upon life-cycle cost analysis (LCCA)
- c. Utilize third party financing to leverage the Army investment requirements

In the short term, Army installations would be prioritized for initial consideration in this program, and CES modernization proposals prepared. The criterion for prioritization includes, but is not limited to:

- a. Mission criticality for that CES
- b. Installation status report (ISR)/equipment condition
- c. Cost of service including O&M costs
- d. Annual energy load/fuel consumption
- e. System efficiency
- f. Square footage of conditioned space
- g. Weather severity
- h. Marginal energy costs
- i. Existing unit cost per area and unit energy use per area
- j. The status of ongoing modernization activities

Each selected installation would prepare a CES modernization proposal and submit it to IMA HQ. The modernization proposal would include a business plan that addresses how third party financing can be used to leverage the Army investment. The installation would identify feasible alternatives for CES modernization, collect data to develop the life-cycle cost for these alternatives, and develop the proposal according to IMA HQ guidance.

In the mid term, the most life-cycle cost-effective modernization projects would implemented using a combination of appropriated funds and alternative financing. The use of conventional coal plants and coal use would be reduced, especially in non-attainment areas, focusing on renewable alternatives and/or coal gasification.

In the long-term, advanced operations and maintenance technologies would be used to keep the systems working at peak efficiency, and extend the life of the CES. Advanced O&M, through predictive or optimized maintenance,

Army Energy and Water Campaign Plan for Installations

would provide real time feedback on system performance and identify potential maintenance problems prior to failure. Advanced monitoring and maintenance could be included in performance contracts if plant operations are out-sourced.

3.3.2 Technologies and Tools Required

A consistent methodology for the installation prioritization and site assessments is required for this work. The Facility Energy Decision System (FEDS) or other commercially available life-cycle cost-based software can provide the framework for assessing energy efficiency retrofit opportunities and evaluating central heating and cooling decentralization options. The new central heating and cooling module provides the LCCA for each full or partial decentralization option under consideration.

3.3.3 Policies, Management, and Institutional Issues

Current Policies: Confirm that funding decisions will be based on lowest life-cycle cost rather than lowest first cost.

Proposed Policy Change: Allow the mixing of third party and appropriated funds to complete the modernization project.

The following are management issues that need to be resolved and policies developed:

- a. How to prioritize projects to insure equity between installations?
- b. How to insure that projects are completed at specific installations?
- c. How to handle CES that are operated by contractors?
- d. How to determine the appropriate mix of third party and appropriated funds?
- e. Can CES be privatized?
- f. Should the Army require all new central heating systems to be low temperature hot water?

3.3.4 Specific Projects to Meet Action

The following are the projects to meet this action.

Establish a technical team. To insure a consistent approach to CES modernization, a technical team would be established to work with the installations and assist in the assessment of CES options and current O&M practices, and development of modernization proposals. The technical team would develop the detailed approach for the installation prioritization, site assessments, and project implementation.

Prioritize Installations. The technical team would prioritize the candidate Army installations for initial consideration in this program. The criteria for prioritization would include mission criticality for that CES, installation status report (ISR)/equipment condition, cost of service including O&M costs, annual energy load/fuel consumption, system efficiency, and the status of ongoing modernization activities. The technical team would recommend installations for initial evaluation, the number based upon budget constraints and direction from IMA HQ.

Develop a Modernization Proposal. IMA HQ would provide guidance to the selected installations for development of CES modernization proposals. This guidance would detail the scope of the program, expectations for the alternatives to consider, LCCA requirements, explicit proposal format, documentation requirements, and project selection criteria. The modernization proposal would have two distinct parts:

- a. Business Plan—This plan would provide the business case for selecting from the feasible alternatives and recommending a course of action that maximizes the value to the Army, while meeting the current and future mission requirements. The business plan would include the LCCA for each alternative, and the funding/third party financing requirements to cost-effectively implement the selected alternative.
- b. Execution Plan—The Execution Plan would be similar to a project or construction management plan with a phased construction schedule, critical milestones, estimated budgets, procurement requirements, and team roles and responsibilities.

Undertake Installation Assessment. Each installation would prepare its CES modernization proposal and submit it to IMA HQ. The installation would identify feasible alternatives for CES modernization, collect data to develop the LCCA for these alternatives, and develop the proposal according to IMA HQ guidance. Alternatives to be considered in the proposal could include, but are not limited to:

- a. Complete refurbishment or replacement of existing CESs and distribution systems
- b. Full or partial decentralization of heating and/or cooling systems
- c. Conversion from steam to hot water in the distribution systems
- d. New central chilled water systems (satellite plants) or additions to existing systems
- e. Combined heat and power (co-generation) capability
- f. Thermal energy storage
- g. Renewable energy sources (wood, landfill gas, biomass, geothermal, etc.)

Develop an Optimized O&M Plan. The technical team would also develop the detailed approach for the installation to optimize the maintenance of existing CES to insure systems continuously operate at or near peak efficiency.

3.3.5 Funding Strategies and Sources

The CES program would utilize third party financing to the extent possible based on the energy and maintenance savings. Third party financing would be through available ESPC and UESC arrangements or the Bonneville Power Administration (BPA). Appropriated funds would be used to supplement the third party financing, and thus minimize the financing term.

In addition, appropriated funds would be used for infrastructure improvements (repair or replace central plant and distribution system) when the CES must be replaced (high priority due to condition) and dollar savings are too low to cover loan payments. Third party financing would primarily be used for efficiency improvements (upgrade central plant, decentralize), and new capabilities (combined heat and power, thermal energy storage, etc.). The Army will also investigate third party financing, construction, operations and maintenance of CES.

3.3.6 Description of End State

- a. All CES at ISR rating of condition two (C2) or better, using the lowest LCC technologies.
- b. All current steam CES converted to hot water unless steam required for process needs.
- c. All current coal fired plants located in non-attainment areas converted to other fuels.
- d. Control systems upgraded to use advanced maintenance technologies.
- e. O&M procedures optimized at each site to maintain peak efficiency in operation of CES.

3.3.7 Metrics of Success

- a. Improvement in ISR rating (fewer red, more green systems)
- b. Reduced cost of service (\$/MBtu basis)
- c. Fully funded modernization projects at specific installations (no partially modernized or incomplete projects)
- d. Long-term and sustained program

3.3.8 Milestones (actions by FY)

Prioritize installations	FY 2007
Prepare modernization proposals	FY 2007-08
Modernize top priority installations	FY 2008-12
Modernize remaining installations	FY 2013-17

Initiative #3: Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy, reducing waste, increasing efficiencies, and improving environmental benefits.***3.4 Action #4: Reduce on-site fossil fuel use for building space heating and domestic hot water.***

This action addresses the reduction of fuel oil as a primary heating fuel in existing buildings through increased use of life-cycle cost-effective renewable technologies.

Fuel oil will continue to become increasingly unattractive as a building heating fuel. Fuel oil heating equipment is energy inefficient and maintenance intensive. As the cost of fossil fuels continue to rise and renewable energy costs continue to decrease, the Army must strive to eliminate fuel oil usage as much as practical. Presently heating fuel oil accounts for 12% of Army energy usage.

Ground-source heat pumps (GSHP) have become a proven technology that can have a large impact on fossil fuel (particularly natural gas) usage in existing buildings. Many Army installations have well-spaced buildings with adequate space and/or parking lots for ground-loop installations. Historically, high initial costs have prevented GSHP from being considered for HVAC retrofit. However, improvements in GSHP technology and techniques, increased usage of GSHP, and the recent significant increases in natural gas costs will make GSHP increasingly life-cycle cost-effective as a retrofit for many Army facilities.

Similarly, new, innovative renewable technologies that can easily be retrofitted into existing buildings are continually being developed. At least two of these, passive solar walls and daylighting, have been sufficiently proven to be considered for retrofit into existing Army buildings and should prove to be cost-effective alternatives in many locations.

For implementation of this action, Army policy requiring evaluation of alternatives for reduction of fossil fuel usage for existing buildings needs to be developed. To implement this policy, knowledge of GSHP and other renewable technologies will need to be increased either through training or by partnering with experts or both. Also prior to implementation, assessment tools such as FEDS 5.0 and/or FRESA will be needed to determine the feasibility of implementation at each installation. After feasible alternatives have been determined, there are two possible methods for implementation. Either a centrally-funded implementation plan will need to be developed, or a plan to provide funding assistance for local implementation projects will need to be executed. Local project development and implementation could use ECIP funding and/or third party financing through ESPC, UESC, or BPA. Centrally-funded assistance would likely be needed to assist installations in development of local projects.

3.4.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Reduce on-site fossil fuel use by retrofit of conventional fossil fuel HVAC systems with ground-source heat pumps (GSHP). Many facilities such as barracks, admin buildings, and Army-owned housing are candidates for GSHP. (S)
- b. Retrofit passive solar day lighting and other renewable technology retrofits such as solar hot water heating and/or transpired solar walls into existing buildings where appropriate. Conduct LCC analysis to screen data and technology. Conduct on-site assessments for top candidates. (S/M)
- c. Eliminate by region fuel oil as the primary fuel for building heating. Twelve percent of Army energy use is heating oil. Initially validate data and establish existing heating system types. Assess LCC effective alternatives, prioritize requirements, and execute program. (L)

3.4.2 Technologies and Tools Required

Installations will need GSHP, day lighting, and passive solar expertise to determine site feasibility. Installations will also need a life-cycle cost-effective-based assessment tools such as FEDS and FRESA to determine LCC-effectiveness.

3.4.3 Policies, Management, and Institutional Issues

Army policy has established a standard for minimum energy efficiency for new construction. A similar standard will be established for minimum energy efficiency for existing buildings similar to requirement for new buildings. A database of energy conservation measures to be evaluated for retrofit projects will also be established.

The Army will include discussion of GSHP or other renewable retrofit technologies in the curriculum for installation energy manager training and will collaborate with knowledgeable experts from DOE national labs or industry to assist with assessment and project development.

The Army will establish policy to eliminate fuel oil as the primary fuel for building heating unless a waiver (approved by ACSIM or IMA region) is justified due to lack of alternatives. It is recognized that there may be isolated instances where there is no cost-effective alternative to use of fuel oil for building heating, but in most areas, more cost-effective alternatives can be found. Fuel oil heating equipment is maintenance intensive. Lack of adequate maintenance on fuel oil heating equipment exacerbates the poor energy efficiency of this equipment.

The Army will establish a goal to reduce fossil fuel use for heating by 50% by FY 2030, from a baseline of FY 2003. The reduction of unnecessary consumption and increase in efficiencies of buildings and facilities combined with development of alternative fuels can have a significant impact on the overall use of fossil fuel for heating.

3.4.4 Specific Projects to Meet Action

An evaluation will be performed to determine the minimum energy efficiency standards for existing buildings based on the type of facility and the climate zone. Once this standard has been determined, a database of potential/proven energy retrofit alternatives for existing buildings will be developed as described in Initiative #2. An assessment tool such as FEDS will be used to evaluate buildings at each installation to determine which retrofit alternatives from the database are life-cycle cost-effective. Individual projects will be developed using the database of alternatives to bring existing buildings up to the minimum energy efficiency standard. Once the projects are identified and developed, a determination will be made regarding the best method for implementation of feasible retrofits—either through centrally-funded program or assistance to installations for local project development for implementation of feasible alternatives.

3.4.5 Funding Strategies and Sources

The funding strategy for implementation of feasible retrofits at each installation depends on the determination of best method at the time installation projects are identified and developed. The least cost of central funding would be to provide central funding to assist installations in development of local projects. Local projects could be executed using third party (ESPC/UESC/BPA) financing or ECIP funds if qualified. A centrally-funded program for project implementation will be established only if it is determined that a centrally-funded program would be the most successful approach.

Central funding can be used for development of minimum energy efficiency standards for existing buildings and development of a database of potential/proven energy retrofit alternatives. Funding requirements for this action will be minimal. To the maximum extent possible, the Army will partner with DOE to share information and help defray costs. Training in renewable retrofit technologies or for technology expert partners will also be a low-cost centrally-funded action.

Central funds will also be provided for development/fielding of an assessment tool (such as FEDS) and determination of feasible retrofit alternatives at each installation. This action will require POM programming so it will not be accomplished prior to FY 2008. Because individual project evaluation and development depends on this action, it will be executed early in the POM cycle.

3.4.6 Description of End State

Wherever determined to be life-cycle cost-effective, Army building heating/cooling systems will be converted to GSHP. Not only will implementation of this action alone dramatically reduce the Army's consumption of fossil fuels, it will greatly reduce the Army's overall building energy usage. Additionally, utilizing the database of

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potential/proven energy retrofit alternatives, the Army will install all life-cycle cost-effective solar HW systems, solar walls for hangars & warehouses, solar pool heating, day lighting, and other renewable retrofit technologies in existing buildings. The Army will no longer use fuel oil as the primary fuel for building heating needs. Existing buildings which utilize fuel oil for heating will be converted to alternate heating fuel and/or system. Execution of these actions will allow the Army to meet a minimum energy efficiency standard for all of its existing buildings.

3.4.7 Metrics of Success

- a. Successful development of retrofit database for existing buildings (from Initiative #2)
- b. Percent of installations with completed assessment of feasible renewable technology retrofits
- c. Percent of installations with implemented renewable retrofits
- d. Percent of Army energy usage from renewable sources
- e. Percent of Army energy usage for heating fuel oil
- f. Percent of Army energy usage fossil fuels for heating
- g. Compliance with new energy consumption (efficiency) standards for existing buildings per the requirements of the EPAct 2005

3.4.8 Milestones (actions by FY)

Establish policy changes. Develop database and provide training of renewable energy retrofits. Apply assessment tool such as FEDS for determining feasibility at each Installation. (Minimal funding)	FY 2007
Determination of retrofits feasible at each installation	FY 2008-09
Development and execution of implementation projects for top 50% ranked by SIR or overall impact to Army energy consumption. Develop and execute projects to reduce heating fuel oil usage to no more than 5% of Army energy usage.	FY 2009-13
Develop and implement remaining projects to eliminate heating fuel oil usage and reduce fossil fuel use for heating by 50%.	FY 2014-25

Initiative #3: Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy, reducing waste, increasing efficiencies, and improving environmental benefits.

3.5 Action #5: Reduce fossil fuel usage in non-tactical vehicles (NTV)

The Army must increase the use of Alternative Fuel Vehicles (AFV) for non-tactical purposes in order to meet Public Law and Executive Order requirements, reduce dependence on petroleum from foreign sources, increase energy security with diversification, free up existing petroleum supplies for the war fighter, and improve air quality (reduce CO, NOx, and Ozone Forming Potential, OFP).

The Federal EPAct 1992 defines an alternative fuel as any fuel that is substantially non-petroleum and yields energy security and environmental benefits. The EPAct recognizes the following as alternative fuels:

- a. Alcohol fuels such as methanol (methyl alcohol), denatured ethanol (ethyl alcohol) and other alcohols, in pure form (called “neat” alcohols) or in mixtures that contain no less than 70% alcohol fuel
- b. Compressed Natural Gas (CNG)
- c. Electricity
- d. Hydrogen
- e. LNG
- f. Liquefied Petroleum Gas (LPG)
- g. Coal-derived Liquid Fuels
- h. Fuels other than alcohols derived from biological materials: like soybean, rapeseed and other vegetable oil-based fuels

In January 2001, the Biodiesel Final Rule made it possible for fleets to earn EPAct credits for use of biodiesel blends of at least 20%. This rule does not make B20 (a 20% blend of biodiesel with diesel) an alternative fuel, but gives one credit for every 450 gallons of pure biodiesel used in biodiesel blends.

Note that clean fuels must be combined with advanced emission control technologies.

Gasoline has been favored because of its high energy content per volume. Alternative fuels require more frequent refueling.

3.5.1 Approaches to Meet Actions and Priorities (S, M, L)

Work in cooperation with GSA and other Federal agencies to promote and procure alternative fuel vehicles for non-tactical applications. Specifically, the Army will support this action through:

- a. the use of alternative fuels in light, medium, and heavy-duty vehicles (S)
- b. the acquisition of vehicles with higher fuel economy, including hybrid vehicles (S)
- c. the substitution of cars for light trucks (S)
- d. an increase in vehicle load factors (use smallest sized vehicles appropriate) (S)
- e. a decrease in vehicle miles traveled (M)
- f. a decrease in fleet size (M)
- g. use of fuel cell cars to support the transition to hydrogen economy (L)

When selecting alternative fueled vehicles for use by an activity the organization must consider the state of the technology, current and potential refueling infrastructure, the available supply of fuel, and environmental, health and safety knowledge.

3.5.2 Technologies and Tools Required

The Army will require development of a Motor Vehicle Management Information System to capture NTV and Base level commercial equipment (BCE) and fuel use by type.

3.5.3 Policies, Management, and Institutional Issues

EPAct 2005

The EPAct 2005, Section 703 "Use of Alternative Fuels by Dual- Fuel Vehicles" requires Section 400AA(a)(3)(E) of the Energy Policy and Conservation Act (42 U.S.C. 6374(a)(3)(E)) to be amended to read as follows:

"Dual fueled vehicles acquired pursuant to this section shall be operated on alternative fuels unless the Secretary determines that an agency qualifies for a waiver of such requirement for vehicles operated by the agency in a particular geographic area in which

- a. The alternative fuel otherwise required to be used in the vehicle is not reasonably available to retail purchasers of the fuel, as certified to the Secretary by the head of the agency; or
- b. The cost of the alternative fuel otherwise required to be used in the vehicle is unreasonably more expensive compared to gasoline, as certified to the Secretary by the head of the agency."

The Secretary [of Energy] shall monitor compliance with this subparagraph by all such fleets and shall report annually to Congress on the extent to which the requirements of this subparagraph are being achieved. The report shall include information on annual reductions achieved from the use of petroleum-based fuels and the problems, if any, encountered in acquiring alternative fuels.

In addition, Section 303(c) of the EPAct 1992 (42 U.S.C. 13212(c)) is amended by striking 'may' and inserting 'shall'.

EPAct 1992

The EPAct 1992 requires Federal agencies when acquiring by purchase or lease EPAct covered vehicles, that 75% of those EPAct covered vehicles be alternative fueled vehicles (AFV).

Executive Order 13149 "Greening the Government through Federal Fleet and Transportation Efficiency" (EO 13149)

EO 13149 requires each agency to: Use Alternative Fuel in Alternative FV 51% of time; reduce NTV Petroleum Consumption 20% by 2005 from a 1999 baseline; increase fleet miles per gallon rating and use the Federal Automotive Statistical Tool (FAST) to report vehicle and fuel data.

The National Defense Authorization Act of 2002 (Public Law 107-107)

Public Law 107-107 requires that only hybrid vehicle light duty trucks are acquired for those fleets that are not covered by EPAct. In addition 5% of the EPAct covered trucks procured in FY 2005 and FY 2006 were and are to be hybrid. Ten percent of the EPAct covered trucks procured in FY 2007 and beyond should be hybrid trucks.

Proposed Policy Changes

Ensure that Army NTV Policy clearly articulates the requirements and methodologies to meet Public Laws and Executive Orders.

Ensure that Army establishes a Motor Vehicle Management Information System to capture vehicles types and sizes, alternative fuel type, alternative fuel used, and other related information by activity and installation. This system should capture Base Level Commercial Equipment (BCE) activity and fuel use, too.

Ensure that Army Policy requires the use of The Federal Automotive Statistical Tool (FAST). Executive Order 13149 requires FAST use by all Federal Agencies. This web based system, is the mechanism to record the number of AFV on hand and projected for an activity. In addition the system permits the activity to update, annually, the amount of fuel used, by type. The data collected by FAST can be used to support other NTV/BCE program metrics.

Work with GSA to ensure that their policies do not negatively impact the implementation of transportation options that reduce oil use.

Management Issues

To support the use of AFV, installations could arrange for fueling at commercial facilities that offer alternative fuels for sale to the public. Installations could team with state, local, and private entities to support the expansion and use of public access alternative fuel refueling stations or use the authority granted to them in section 304 of the EPAct 1992 to establish nonpublic access alternative fuel infrastructure for fueling Federal AFV where public fueling is unavailable. Encourage AAFES to offer Alternative Fuels on Installations. Build the installation NTV fleet around a particular alternative fuel for maximum effect.

3.5.4 Specific Projects to Meet Action

- a. Continue to work with GSA to provide hybrid & fuel efficient vehicles on lease
- b. Encourage the Army and Air Force Exchange Service (AAFES) to offer alternative fuels at their commercial fueling stations.
- c. Develop Army policy to reduce fossil fuel use in NTV.
- d. Explore new technology for hydrogen economy and assess potential benefits to Army. Establish a hydrogen refueling site at West Point, secure the hydrogen vehicles from the private sector and assess potential benefits.
- e. Replace sedans and work trucks with electric or motorized carts where appropriate.

3.5.5 Funding Strategies and Sources

Continue to use a surcharge for all Army NTV users to generate funding for reaching AFV goals.

3.5.6 Description of End State

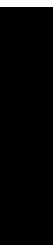
- a. All non-tactical vehicles are either AFV or hybrid vehicles
- b. GSA provides complete fleet of hybrid and/or alternative fuel vehicles.
- c. Use of small and ultra-efficient cars.
- d. Smart base design to reduce transportation needs.

3.5.7 Metrics of Success

- a. Percent of leased vehicles that are hybrid and/or high mpg.
- b. Percent of alternative fuel vehicles
- c. Average EPA fuel economy rating of non-tactical vehicles
- d. Attainment of Executive Order 13149 and EPAct 2005 requirements

3.5.8 Milestones (actions by FY)

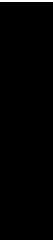
30% hybrid /high mpg /alternative fuel NTV	FY 2010
80% hybrid /high mpg /alternative fuel NTV	FY 2015
100% hybrid high mpg /alternative fuel NTV	FY 2030



Tab Number 5

Initiative Number 4

Conserve Water Resources



Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.

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Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.***4.1 Action #1: Assess the current water use, costs, and availability at Army installations to prioritize sites for analysis of water conservation opportunities.*****4.1.1 Approaches to Meet Actions and Priorities (S, M, L)**

Understand the current state of water use at Army installations and prioritize sites for analysis of water conservation opportunities.

- a. Develop baseline per capita full time equivalents, taking into account National Guard and Reserve Component situations with large population fluctuation (S)
- b. Meter and track usage by end-use (domestic, irrigation, industrial) (M-L)
- c. Determine water rates (and also sewer rates) and whether sites produce water on-site or purchase water from a local utility (S)
- d. Analyze for potential droughts or water shortages (S)
- e. Consider commercial value as the value of water at installations where water is produced on-site and estimate commercial value (M)
- f. Identify uses, quantities and potential for non-potable water (M)
- g. Investigate feasibility of regional non-potable water system (L)

4.1.2 Technologies and Tools Required

This task will require currently available data on building inventory, water use, water rates, and other associated information be compiled. It will also require an assessment of which water uses could be non-potable or reclaimed water supplies, in place of treated potable water.

4.1.3 Policies, Management, and Institutional Issues

Current Policies: Executive Order 13123 required establishment of water conservation goals. The DOE responded to that requirement by setting qualitative goals directing all Federal agencies implement best management practices (BMP) for water conservation. DOE identified ten measures qualifying as BMPs in their December 2000 guidance on EO 13123. Per that guidance, Federal agencies are to implement at least four of the ten BMPs in an increasing percentage of facilities, up to 80% of facilities by 2010.

Proposed Policy Changes:

- a. Eliminate the requirement for implementation of a minimum number of BMPs, and instead assign a quantitative goal tied to measurable water use reduction. Set the goal in increments and require a rationalization for any of the BMPs can not be adopted at a specific installation.
- b. Mandate the use of non-potable, reclaimed water for compatible uses such as fire fighting, irrigation, sanitary flushing, etc., when these processes can be supported by appropriate non-potable water distribution systems, unless cost-prohibitive.

For the National Guard and Reserve Components, this policy applies to training centers and Reserve Readiness Centers which have a minimum of 250,000 square feet of facility space as a single location and are used intermittently.

Management Issues:

- a. Lack of baseline hinders ability to gauge progress
- b. Most installations lack metering
- c. Lack of specific water conservation numeric target provides no incentive
- d. Ability to maintain safety and health requirements of dual water systems

Institutional Issues:

- a. Water is usually an abundant resource, which most people put little value to until a time of service interruption or shortage.
- b. Public health officials' and residents' acceptance of non-potable water systems that are in close proximity to potable systems without fear of cross-contamination or accidental misuse by installation residents.

4.1.4 Specific Projects to Meet Action

Completion of the data base in the following steps:

- a. Building inventory compiled
- b. Installation water use compiled
- c. Water rate information researched and documented
- d. Identify requirements for non-potable water use
- e. Drought information researched and compiled regionally and mapped over Army installations

4.1.5 Funding Strategies and Sources

Utilize annual SRM funding to assess the current water use, costs, and availability at Army installations for prioritization of sites for analysis of water conservation opportunities. Privatized water distribution would be funded by the owner of the system. Priority for funding projects would be based on ISR Rating, detailed condition assessment, economic analysis, installation priority, any future water needs, and other project justifications.

4.1.6 Description of End State

Army has a populated database with timely, accurate, and quality data that is current that enables the Army to prioritize efforts for water conservation and a list of prioritized site to investigate initiatives

4.1.7 Metrics of Success

Prioritized list of installations at which to conduct water surveys

4.1.8 Milestones (actions by FY)

Database completed	FY 2008
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Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.**4.2 Action #2: Improve the water storage and distribution system integrity.****4.2.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Map all water systems using GIS (L)
- b. Perform condition survey of water distribution systems (M)
- c. Rank system by ISR rating (S)
- d. Perform periodic leak detection surveys (S)
- e. Perform required repairs based on survey results (M)
- f. Upgrade storage and distribution infrastructure to ISR C2 condition. (M)
- g. Conduct continuous commissioning through water balance analyses (see Initiative 1 for metering) (L)
- h. Implement corrosion protection monitoring program (M)

4.2.2 Technologies and Tools Required

Develop Blanket Purchase Agreement-type contract for leak detection services. Program funds for surveying a minimum of 10% of installation water systems per year. Include maintenance and repair of valves, meters, and controls.

Include similar provisions in utility privatization contract actions for water distribution systems.

4.2.3 Policies, Management, and Institutional Issues

ISR standards for water storage and distribution systems should be updated, so that leaking systems receive an appropriate rating. Metering policies should also be in place that will enable identification of potential leaks. Implement annual water distribution flushing program and continuous program to identify areas of low or inadequate pressure, stagnation, or unusual water losses.

Utility infrastructure construction requirements receive very low priority when competed against other MILCON and SRM projects that directly support the military mission.

4.2.4 Specific Projects to Meet Action

- a. Identify sites with aging infrastructure
- b. Train staff on distribution system auditing and leak detection (general knowledge so that staff can work with contractors)
- c. Perform distribution system audits at these sites
- d. Develop contracts with regional leak detection services
- e. Perform leak detection and repair leaks
- f. Institute corrosion control standards
- g. Update guide specifications to include leak testing in new water distribution system commissioning
- h. Provide resources to achieve these water management actions

4.2.5 Funding Strategies and Sources

Utilize annual SRM funding to repair waterline breaks and leaks. Privatized water distribution would be funded by the owner of the system. Priority for funding projects would be based on ISR Rating, detailed condition assessment, economic analysis, installation priority, any future water needs, and other project justifications. Water storage and distribution system upgrades not life-cycle cost-effective would be captured and funded as utility modernization program projects.

4.2.6 Description of End State

- a. Less than 1.0% (or the American Waterworks Association standard) leak rate per mile of line
- b. Replacement of aging infrastructure complete
- c. Privatized systems will achieve an industry standard level of condition within three to five years of contract award

4.2.7 Metrics of Success

- a. ISR storage and distribution system rated at least C1
- b. Percent leak rate across all sites

4.2.8 Milestones (actions by FY)

100% initial surveys complete	FY 2011
Repairs complete	FY 2015
Corrosion programs in place	FY 2015
System upgrades complete	FY 2025
Continuous commissioning program in place	FY 2025

Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.***4.3 Action #3: Increase water efficiency of all plumbing fixtures.***

Water efficiency standards currently in effect were established in the EPAct 1992 (Public Law 102-486). The EPAct 2005 (Public Law 109-58) did not strengthen water management provisions of EPAct 1992 as pertaining to Federal facilities.

4.3.1 Approaches to Meet Actions and Priorities (S, M, L)**New Construction**

Plumbing fixtures, including toilets, urinals, faucets, and showerheads, shall exceed the performance requirements of the EPAct 1992, as amended in all new construction and major renovations. This criteria will meet Leadership in Energy and Environmental Design New Construction (LEED-NC) 2.2 Water Efficiency Credit C 3.2 criteria.

Install water meters in all new construction. (S)

Existing Buildings

For existing buildings, all domestic fixtures shall be replaced to meet provisions of EPAct 1992 as amended, which have a simple payback of 10 years or less. In drought or water imperiled areas, maximum payback periods of 15 years may be used for water conservation projects. Install meters in existing buildings during major renovations. (M-L)

All Buildings

No potable water used for flushing toilets or urinals: either non-water using toilets and urinals or reuse of other water sources (such as gray water) to flush toilets and urinals that use water. (L)

4.3.2 Technologies and Tools Required

The key technologies that are essential to making the action item a success are identifying the well performing and cost-effective domestic fixtures that exceed EPAct 1992 standards for toilets, urinals, faucets, and showerheads. Water-using appliances, such as clothes washers and dishwashers will be included and they should be at a minimum meet Energy Star criteria.

Examples of current fixtures that exceed EPAct 1992 Standards are 1.0 gallon per flush pressure assisted toilets, dual flush toilets, 0.5 gallon per flush urinals, no-water urinals, composting toilets, ultra-low flow faucets and showerheads that have a flow rate less than 2.5 gallon per minute. For clothes washers, horizontal axis washers are the highest efficiency models on the market.

Develop or identify an industry-based training program for repair and maintenance of water efficient fixtures and appliances to maintain these devices in peak performance.

Acceptable Materials List

The Army should collaborate with the other services, the DOE and General Services Administration to participate in developing a technology database or approved purchase list of appropriate and well-performing plumbing fixtures. This list would provide the specifications and standards to assist sites in purchasing domestic fixtures that will have overall good performance and exceed EPAct 1992 Standards. The list should also provide typical cost information and economics of the fixtures. This list will help Army installations make well informed decisions when purchasing domestic fixtures.

Prioritized Projects for Retrofits

Installations that are good candidates for fixture replacement should be identified (as described in Action 4.1). This list should be based on which sites have expensive water rates, drought conditions, or other likely water supply constraints either currently or in the future. Audits can then be performed at these sites to determine the most appropriate fixture replacement.

Background Information

To help determine which fixtures are appropriate for Army installations, there are current performance tests and “approved lists” offered by water utilities for toilets for example, which are offered by water utilities. The Maximum Performance Testing of Popular Toilet Models is an example of a study that identifies the actual performance of a variety of different toilet models and grades each model based on a standardized testing procedure. This study includes 1.0 gallon per flush toilets as well as dual flush toilets. (Information can be found at: http://www.cuwcc.org/products_tech.lasso)

Similar information should be researched or developed for the other domestic fixtures; urinals, showerheads, and faucets; so that Army planners and designers have guidelines for new construction, installation, and retrofit. For example, information should be researched on the performance and maintenance of no-water urinals so that decision makers can determine where this fixture is appropriate for the Army installations.

The life-cycle cost-effectiveness can be used to help identify fixture suitability as well. In FY 2006, FEMP will issue a document that shows the life-cycle cost-effectiveness of domestic fixtures that reveal at what water rate typical fixtures have a positive net present value.

4.3.3 Policies, Management, and Institutional Issues

EPAcT 2005

The requirement of the EPAct 2005 on this Action includes:

Section 131: “Energy Star Program”. The provisions of this section include:

- a. The Energy Star program (www.energystar.gov) will be codified and the responsibility will be divided between the EPA and DOE.
- b. Energy Star product criteria will be regularly updated and appropriate lead time be provided prior to the effective date for new or significant revisions to a product category.
- c. DOE shall establish new Energy Star qualifying levels for clothes washers and dishwashers by January 1, 2006, to be effective by January 1, 2007. DOE shall establish new Energy Star qualifying levels for clothes washers by January 1, 2008, to be effective by January 1, 2008.

Section 136: “Energy Conservation Standards for Commercial Equipment” requires DOE to engage in rulemaking to create national energy efficiency standards for a number of commercial appliances and equipment. These products include packaged air conditioning and heating equipment; various types of commercial refrigerators, freezers and refrigerator-freezers; commercial ice makers; and commercial clothes washers. See http://www.eere.energy.gov/buildings/appliance_standards/

Management and Institutional Issues

After the Acceptable Material List is developed, a policy will be established that requires all new construction and major retrofits to install domestic plumbing fixtures that exceed the efficiency standards established in the EPAct 1992, as amended. Performance standards and cost-effectiveness can help make the case for this requirement. As a long-term goal, establish a policy that requires the Army to only using reclaimed sources of water for flushing toilets and urinals, or the use of non-water using toilets and urinals.

New fixtures may have different operations and maintenance requirements than standard conventional fixtures, education and training of staff may be needed to install and maintain these fixtures. Staff must understand any new requirements and how to best apply them to their particular location.

4.3.4 Specific Projects to Meet Action

- a. Research well performing fixtures and translate these into generic specifications that define good performance. (The purchase of specific name brands cannot be required.)
- b. Research typical Federal costs for fixtures that meet these standards
- c. Develop economic guidelines that reveal typical life-cycle cost-effectiveness of fixtures
- d. Institute use of list that provides the specifications for well-performing fixtures
- e. Establish policy that requires the use of fixtures that meet these standards
- f. Measure compliance by addressing requirement in installations’ annual report submittals

4.3.5 Funding Strategies and Sources

Funding requirements for developing and disseminating Army efficiency standards for plumbing fixtures and disseminating government standards to Army installations are provided within the Office of the Assistant Chief of Staff for Installation Management operating budget. The expense to research Federal plumbing efficiency requirements and availability of fixtures that meet those requirements would be

4.3.6 Description of End State

- a. Acceptable Materials List is developed and available to installations
- b. Policy is in place that requires use of fixtures that meet standard
- c. All fixtures exceed EPAct 1992 or current standard
- d. No potable water used to flush toilets and urinals

4.3.7 Metrics of Success

The penetration rate of fixtures that exceed EPAct 1992 standards is 20% by FY 2015, 50% by 2020, and 100% by FY 2025. This will require a reporting requirement by installations on the implementation of pluming fixtures.

4.3.8 Milestones (actions by FY)

Identify fixture standards and Acceptable Materials List developed and policy in place	FY 2008
25% existing facilities meet criteria	FY 2015
50% existing facilities meet criteria	FY 2020
100% existing facilities meet criteria	FY 2025

Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.***4.4 Action #4: Limit potable water used for irrigation and increase use of native plants in landscapes.*****4.4.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Conduct surveys and develop prioritized list of installations (specify minimum acres) where water saving landscaping techniques are required. (S)
- b. Develop regional water saving landscaping plans with recommended plant list and water management plan requirements (M)
- c. Develop O&M performance contract that emphasizes water efficiency. (S)
- d. Apply principles of water saving landscaping (M)
- e. Reuse water from other sources (reclaimed effluent). Develop standard design for “gray-water”/reclaimed water systems for new and renovated buildings (L)
- f. Develop and adopt water restriction landscape irrigation policies when drought conditions or limited water resources exist (M)
- g. Institute community awareness, education, incentives and rebates (M)
- h. Implement rainwater harvesting where appropriate and utilize non-potable sources (wells, surface, etc.) (L)

4.4.2 Technologies and Tools Required

Treatment, storage and distribution system materials and technologies for reclaiming sanitary wastewaters for reuse as an irrigation water source or a separately piped sanitary flushing. The system must be designed, constructed, operated and maintained in such a manner that human health is protected while irrigation and sanitary needs are satisfied.

Ability for work crews to readily identify the reclaimed water piping system in the field if uncovered and a positive protection system from accidental cross connection to a potable water system.

4.4.3 Policies, Management, and Institutional Issues

Current Policies: AR 200-1, Environmental Protection and Enhancement, states that Army activities will evaluate the use of innovative/alternative technologies for the treatment of wastewater. Reclamation of treated wastewater for irrigation purposes in place of potable water certainly supports this mandate. AR 200-3, Natural Resources – Land, Forest and Wildlife Management, requires a comprehensive approach in designing and maintaining the built environment to minimize as much as possible landscaped areas requiring irrigation and grounds maintenance, in keeping with the military mission and aesthetic values. Native and low maintenance plants are preferable. Irrigation will not be used in arid areas to create or maintain environments to grow non-arid plants. Arid and semi-arid installations will make use of desert and low moisture (xeric) landscaping materials. Irrigation in arid areas will be limited to select high visibility areas or where required to maintain vegetative cover for a designated use (such as a golf course.).

Water saving landscaping plans need not be separate documents from installation water management plans. Depending on the location and specific landscaping and irrigation situation, these considerations could likely be included in an installation’s water management plan. Landscaping considerations must be consistent with the Installation Design Guide and sustainability considerations.

4.4.4 Specific Projects to Meet Action

- a. Ensure Installation Design Guides adequately address low water using landscape considerations
- b. Develop criteria for determining where water saving landscaping techniques will likely be cost-effective
- c. Installation plans addressing low water landscape considerations are in place
- d. O&M contracts that emphasize performance and water efficiency are in place
- e. Low water landscaping training developed and disseminated on periodic basis
- f. Low water landscape principals and practices in place
- g. Water reuse, rainwater harvesting, and other techniques in common practice

4.4.5 Funding Strategies and Sources

Use annual SRM funding to repair and maintain existing irrigation systems or replace with high efficiency systems and re-vegetate planting areas with native low-water using plants. Privatized housing areas would be funded by the owner of the system. Priority for funding projects would be based on ISR Rating, detailed condition assessment, economic analysis, installation priority, any future water needs, and other project justifications.

4.4.6 Description of End State

No sites use potable water used for irrigation except at sites where use of non-potable water for irrigation is demonstrated to be cost-prohibitive. High water efficiency practices in use at all installations.

4.4.7 Metrics of Success

Penetration of efficient technology is 20% greater than previous reporting period

Reduction in the amount of potable water used in irrigation is 20% more than the previous year.

4.4.8 Milestones (actions by FY)

Evaluate sites for likelihood of cost-effectiveness of irrigation and water saving landscaping measures	FY 2008
All sites where water saving landscaping and irrigation measures show to be cost-effective have plans that address implementation	FY 2010
50% of sites have implemented best management practices for landscaping and irrigation	FY 2015
75% of sites have implemented best management practices for landscaping and irrigation	FY 2020
100% of sites have implemented best management practices for landscaping and irrigation	FY 2025

Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.***4.5 Action #5: Increase efficiency and reduce losses in process water use (cooling towers, equipment that uses single pass cooling, boiler/steam systems, vehicle wash station, construction)*****4.5.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Audit process water use at installations (S)
- b. Increase efficiency for cooling towers and boiler/steam systems with water treatment and automatic systems (M)
- c. Institute a policy that restricts the purchase of systems that use single pass cooling (S)
- d. Replace single pass cooling with closed loop systems (M-L)
- e. Use high pressure/low volume nozzles in vehicle wash stations (M)
- f. Reuse water in vehicle wash stations (M)
- g. Eliminate water use soil compaction for construction; replace with mechanical tamping (S)

4.5.2 Technologies and Tools Required

A water management guide should be developed that addresses water chemistry issues, blow down, and proper selection of water using appliances. The guide should also discuss uses of water to be avoided and provide substitute methods of accomplishing same task. Redevelop and/or update a guide specification for contracting industrial water treatment programs at installations.

4.5.3 Policies, Management, and Institutional Issues

A policy will be established to prevent the use of single pass cooling systems using potable water and require replacement by FY 2010 using a phased approach (see below). A policy should also be developed to prevent the use of water for soil compaction on construction projects. Review design guidance for wash racks and stations to ensure water efficient design techniques are incorporated. Ensure that as Army Regulations change and content is reduced technical information and requirements are available in an appropriate format to guide proper operation of water systems, such as blow down and water chemistry techniques and programs for boiler/steam systems and cooling towers.

4.5.4 Specific Projects to Meet Action

- a. As part of general facility maintenance, plan for the removal and replacement of single pass cooling systems. Many of these may be “equipment in place” and not belong to the DPW. See policies above to address this problem. A phased program starting in FY 2008 and ending in FY 2012 to replace single pass cooling equipment (20% per year).
- b. Establish formal industrial water treatment program addressing cooling towers and water based conditioning systems.
- c. Establish an equipment/water conservation measure auditing program or expand current and/or proposed energy auditing programs to include water conservation audits.

4.5.5 Funding Strategies and Sources

The Army will take advantage of any Federal water-specific ESPC. If not available at the Federal level, the Army should work with the other services to establish a water-specific ESPC that would be a vehicle to implement these types of projects that typically have high first cost. Require contractors and privatized utility systems to meet requirements as part of regular program. Establish a funding stream for systems which are not equipment in place, not privatized, and not contracted out. Funds should be \$4M per year FY 2009 through FY 2013 to replace single pass equipment and implement effective industrial water treatment programs. For conducting audits, up to \$2M per year FY 2008 through FY 2012 could be spent on conducting comprehensive audits of water using systems.

4.5.6 Description of End State

- a. Prioritized list of installations with critical need for upgrades of systems that use process water
- b. Policy in place that restricts the purchase of systems that use single pass cooling
- c. All single pass cooling replaced by closed-loop systems

- d. Functioning program for water treatment in cooling towers and boiler/steam systems at installations
- e. All tactical and commercial vehicle wash stations are closed systems
- f. Policy in place that limits and restricts the use of water in construction

4.5.7 Metrics of Success

Increasing percentage of process water equipment replaced with new, more energy efficient, less water consuming equipment

4.5.8 Milestones (actions by FY)

Policy changes implemented and sites identified with large potential for savings in process water using equipment	FY 2008
Water system audit program complete	FY 2012
All central vehicle wash facilities (tactical) converted to recycle water	FY 2016
All on-post vehicle wash facilities (including commercial) recycle water	FY 2022
Single pass cooling equipment out of inventory, industrial water program established at all installations	FY 2029

Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.**4.6 Action #6: Prioritize projects and develop implementation strategies****4.6.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Compile results of water audits to develop a list of viable projects (S)
- b. Identify financing options for projects (SRM, ECIP, UESC, ESPC, BPA, EUL) (M)
- c. Develop a prioritization and evaluation tool for water saving projects with projected minimum of 2% reduction in potable water use per year. (S)
- d. Pursue bundling water saving measures with other energy conservation measures in ESPC projects. (S)
- e. Enhance financing of projects (S)
 - Provide incentives for and expand the recognition of water conservation achievements in the Secretary of the Army Energy and Water Management Award Program
 - Identify utility rebate programs
 - Identify other Federal Agency/state grant opportunities

4.6.2 Technologies and Tools Required

Use, and if necessary, modify the IMA Project Prioritization System (PPS) to capture water project requirements. Improve use of ESPC to implement water conservation projects, such as bundling water saving measures with those saving energy commodities with higher unit costs. Consider and pursue all viable financing and contracting tools to complete water projects. Communicate water management success stories on the Army Energy Program website.

4.6.3 Policies, Management, and Institutional Issues

OACSIM, IMA and Army installations shall evaluate the criteria for prioritizing water projects against other types of energy conservation projects. Water efficiency projects typically compete poorly against other installation projects for funding, mainly because of the relatively low cost of water in most locations. To improve life-cycle cost-effectiveness of water conservation projects, specific escalation rates for water should be developed and used in determining the life-cycle cost analysis of water saving projects. Currently, the NIST Annual Supplement to Handbook 135, Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis does not contain factors for the commodity of water, water is simply considered as non-energy cost. Escalation rates for water should increase faster than those for energy commodities, to portray greater worth in the future value of water.

The method for prioritizing water projects should be based on the economic analysis, site level priority, and future water needs. The current PPS criteria for prioritizing projects are not suitable for water conservation projects and must be reviewed and updated.

4.6.4 Specific Projects to Meet Action

- a. Identify/establish a project tracking and prioritization system (IMA HQ)
- b. Install metering and establish a baseline.
- c. Complete necessary project documentation (that is, DA Form 4283 Work Request and/or DD Form 1391).
(installation or organizations that identified the project)
- d. Compile list of current viable water projects (IMA Regions and Installations)
- e. Projects entered into the Priority Placement System (PPS)
- f. Update list when audits have been completed and additional projects have been identified.
- g. Program Objective Memorandum (POM) Submission completed and updated annually.
- h. Provide incentives for building occupants to reduce potable water usage.

4.6.5 Funding Strategies and Sources

The costs to actually prioritize projects and develop implementation strategies will be minimal. Installations will need to select the best and most appropriate funding sources (that is, SRM, ECIP, UESC, ESPC, BPA, EUL, MCA) for programmed projects. The Army needs to provide authority to leverage other financing opportunities, such as

through the Bonneville Power Administration. Determine funding priorities on the economic analysis, installation priorities, future water needs and other project justifications. Identify and take advantage of rebates being offered by water service providers. In addition to rebates potentially available from water service providers, installations may be able to free up water funding when their water and waste water services are from the same provider. If waste water treatment costs do not take into consideration the volume of water used for landscaping or other processes that divert used water from treatment, the provider may agree to reduce costs billed for treatment.

4.6.6 Description of End State

- a. Tools in place and funding plans developed for water projects at site level.
- b. Plans and strategies developed and in place for improving water use efficiency

4.6.7 Metrics of Success

- a. Amount of funding invested in water projects annually
- b. Reduce per capita water use by 20% over next 10 years

4.6.8 Milestones (actions by FY)

Secretary of the Army Energy and Water Management Awards program revised to put increased emphasis on water saving initiatives	FY 2008
Financing guide developed	FY 2008
Prioritized project implementation	FY 2008-25

Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.***4.7 Action #7: Develop technical standards and training to facilitate project development and implementation.*****4.7.1 Approaches to Meet Actions and Priorities (S, M, L)**

Develop technical performance guidance based on: (S)

- a. Installation Design Guide Updates
- b. LEED/SPiRiT
- c. Technical Assistance/Design review

Expand installation energy manager training programs to support water management requirements of this Campaign Plan. (S-M)

Although elements of this action are closely related to those covered in actions discussed in earlier sections of this Campaign Plan, such as those on efficient design and energy manager training, they are addressed in this section to increase focus on water management programs.

4.7.2 Technologies and Tools Required

Training for specific areas will need to be developed that should support the varying needs and budget constraints of the installations and their personnel. This program should join forces with other government agencies, industry, and local utilities in developing and providing this training such as DOE/FEMP and EPA. The CEM training/certification is excellent in developing energy managers, but there is not an equivalent training/certification for water managers. The Water Resource Management Course provided by DOE/FEMP is a good training example.

4.7.3 Policies, Management, and Institutional Issues

The Army will adopt qualification standards established by DOE and/or EPA for all the various personnel currently accomplishing or being hired to accomplish water management responsibilities at installations. Where non-existent, the Army will collaborate with DOE, EPA and the other Defense Services to develop these qualification standards. A certification program for energy managers with specialization in water issues will be instituted.

Technical performance guidance will be established for possible inclusion in IDG updates, landscape plans, water and/or water management plans. Require that energy/water managers also get LEED AP certification along with CEM certification

4.7.4 Specific Projects to Meet Action

- a. Identify knowledge, skills, and abilities for various personnel performing water resource management.
- b. Develop/identify technical performance guidance, technical assistance sources, and design review assistance.
- c. Develop/identify water management training and certification program requirements as a special focus area for energy managers.
- d. Develop training plan for installation personnel accomplishing the various water management responsibilities.

4.7.5 Funding Strategies and Sources

The level of training and technical assistance provided for an installation and its personnel would be based on site level priority, and any future water needs. Where appropriate, utilize web based technical sources and training to minimize costs. Joining forces with other government agencies, industry, and local utilities in developing and providing training would reduce training costs.

4.7.6 Description of End State

- a. All major installation energy managers trained in water conservation issues.
- b. Technical guidance in place on water-related projects, which require same level of detail, economic analysis, performance metrics, and viability as energy projects.

4.7.7 Metrics of Success

- a. Increased number of staff trained in water conservation
- b. Increased number of projects developed, designed and implemented with measurable performance metrics

4.7.8 Milestones (actions by FY)

Training and technical guidance identified or established	FY 2007
KSA established, training plans developed and technical guidance available	FY 2008
All major installation energy managers trained and certified in water conservation projects	FY 2009

Initiative #4: Reduce water use to conserve water resources for drinking and domestic purposes.**4.8 Action #8: Identify water resources for future demands to meet mission critical needs (and plus ups).**

In certain instances, depending on the location and mission criticality of the installation, some installations may find that even implementing all applicable water conservation measures still may not be enough to meet the installation future water demand requirements. In those cases, and as normally part of an installation water management plan, it will be necessary to seek alternate sources of water.

4.8.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Identification of critical mission sites where water supplies may be limited or at risk to prioritize Army support efforts and available alternate water supply resources. (S, M, L)
- b. Identification of new and alternate water supplies in the installation region. (S, M, L)
- c. Identification of water reuse/recycling opportunities, rainwater harvesting, gray water techniques and any other possible conservation measurement that may prolong available water resources at the installation. (S, M, L)
- d. Above approaches should be repeated every five years.

4.8.2 Technologies and Tools Required

Technology and tools required for the implementation of above approaches are:

- a. Financial tools
- b. Engineering, legal, contracting, and real estate services
- c. Water processing and distribution related technologies (for example, water filtration and purification technology, piping, environmental etc.)
- d. Water storage technologies
- e. Water metering

4.8.3 Policies, Management, and Institutional Issues

- a. May require legislation to ease up water rights opportunities for the Federal Government
- b. May require tighter management oversight to ensure water conservation measurements are adequately implemented
- c. Initiative implementation may be affected by limited funding

4.8.4 Specific Projects to Meet Action**Develop Army Critical Sites Prioritization List**

Determine:

- a. Sites where supply may be limited or at risk
- b. Existing water rights
- c. Possible regional sources of water
- d. Current and alternate water rates in the region
- e. Applicable water rights laws and regulations
- f. Applicable environmental laws and regulations
- g. When applicable, necessary permits

Identify Feasible Alternate Water Sources Opportunities

- In those installations/sites that are determined to be mission critical and water supplies are limited or at risk, conduct a life-cycle cost study and determine the installation specific most feasible, effective, and efficient alternate water sourcing opportunities among the following (but not limited to)
- a. Water conservation, reuse (recycling) opportunities, rainwater harvesting, gray water techniques, and other areas to cut demand in replace of finding new supplies
 - b. Possibility of increasing water rights
 - c. Partnering with region water municipal or state communities

- d. Feeding from other close Federal or military facilities with excess water capacity
- e. Feeding from new and/or alternate water supplies in the region

Identify Funding Strategy

Based on the result of the identification and viability of alternate water sourcing opportunities section above, determine best funding strategy for implementation of the opportunities. If direct funding is needed, develop schedule of funding request for upcoming and future POM submissions.

Develop/Update Water Management Plan

Based on the research performed to identify critical sites, feasible alternate water sources opportunities, and funding strategy, develop or update, as applicable the critical sites specific water management plans.

Obtain Necessary Permits

Obtain any required real state, environmental, and safety permits.

Implement Alternate Water Sources Opportunities

Once funding is available, implement the identified installation specific most viable, effective, and efficient alternate water sourcing opportunities projects.

4.8.6 Funding Strategies and Sources

- a. Implement opportunities that installations can implement through the regular operation and maintenance of the installation facilities.
- b. Consider use of ESPC, UESC and ECIP for funding project.
- c. Incorporate direct funding requirements in upcoming POM cycle.

4.8.7 Description of End State

Increased capability of installation to forecast future water needs, identify water resources or alternative means to meet water demand of mission critical areas

4.8.8 Metrics of Success

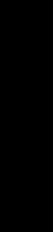
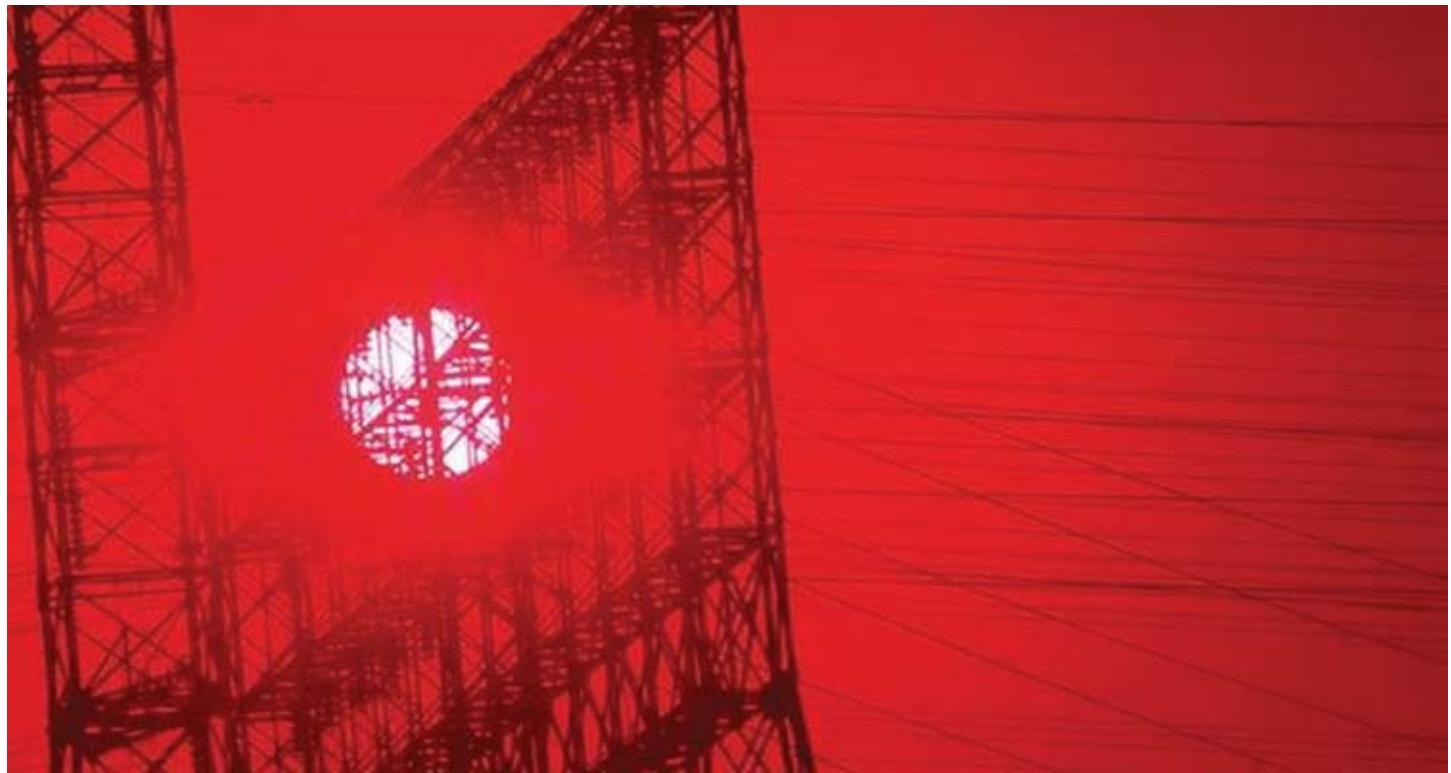
100% of all Army installations with sustainable water supply.

Increase number/percentage of installations participating in an area-wide regional water planning group and having in place a 25-year project development plan to meet further water demands.

4.8.4 Milestones (actions by FY)

Development of Army critical sites prioritization list	FY 2010
Identification of feasible alternate water sources opportunities	FY 2011
Identification of funding strategy	FY 2011
Development/update of Water Management Plan	FY 2011
Obtain necessary permits	FY 2013
Implementation of alternative water sources opportunities	FY 2015
Repeat cycle *	

* Because of the continual changes in mission and drought patterns, Army should reevaluate critical sites and their needs for alternate water sources opportunities at least every five years.



Tab Number 3

Initiative Number 6

Improve Energy Security



Initiative #5: Improve the security and reliability of our energy and water systems in order to provide dependable utility service.

Action	Page
5.1: Institute energy security concepts and methodologies in Army installation management operations	109
5.2: Implement energy security plans and continuously improve the Army Energy Security Program	111
5.3: Use current and projected energy sources with greatest potential for availability and economy	113

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Initiative #5: Improve the security and reliability of our energy and water systems in order to provide dependable utility service.

Introduction: Energy security is the capacity to avoid adverse impact of energy disruptions caused either by natural, accidental or intentional events affecting energy and utility supply and distribution systems. Increasing energy security leads to improved reliability. Energy security programs take a different perspective than conventional energy management programs. Whereas energy management programs typically reduce energy consumption and cost, in most cases energy security is viewed as a cost obligation rather than cost avoidance. Cost avoidance or economic benefits of increased energy security are not easily quantified as we typically view baseline conditions as uninterrupted and reliable utility service.

5.1 Action #1: Institute energy security concepts and methodologies in Army installation management operations.**5.1.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Develop energy security survey methodology (S)
- b. Develop standards for utility system and energy supply reliability (S)
- c. Develop facilities prioritization methodology (S)
- d. Update installation energy security plans and water vulnerability assessment and response plans (M)
- e. Develop economic impact methodology for various energy interruption scenarios

5.1.2 Technologies and Tools Required

- a. Energy security plan checklist
- b. Energy security plan template
- c. Survey methodology that quantifies apparent reliability
- d. Energy security cost estimating and planning tool
- e. Interface with existing facility systems
 - ISR
 - HQEIS
 - Maintenance and repair historic information

5.1.3 Policies, Management, and Institutional Issues

- a. Army Regulation 420-49, Facilities Engineering Utility Services
- b. Defense Energy Program Policy Memorandum 92-1, DOD Energy Security Policy
- c. Army Regulation 525-26, Infrastructure Risk Management
- d. DOD Directive 3020.40, Defense Critical Infrastructure Program
- e. DOD Directive 2000.12, DOD Antiterrorism Program
- f. DOD Instruction 2000.16, DOD Antiterrorism Standards
- g. Critical infrastructure and facilities standards
- h. Sensitivity of information contained in energy security plans
- i. Energy security considerations of privatized utility systems

5.1.4 Specific Projects to Meet Action

- a. Develop methodology for conducting energy security vulnerability assessments and remediation plans. Include a cost component to the vulnerability assessment, the potential expense or unacceptable impact of not mitigating the vulnerability in terms of lost service, productivity, operations, health costs, evacuation costs, ability to achieve mission, etc. The methodology needs to account for all potential sources of disruption short of localized, total destruction (for example, from hurricane) or global disaster. This will yield a single survey tool that can evaluate both the threat of normal system failure or intentional disruption. Finally, the level of effort for the survey needs to be flexible to account for differing reliability goals—a highly critical facility would naturally require a more in-depth survey than a less critical facility. A dynamic software model to identify vulnerabilities may be appropriate for some applications.
- b. Establish Reliability Standards. A set of reliability requirements based on facility mission needs to be developed.

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The Army cannot afford for every “critical” facility to achieve the same high level of reliability. However all facilities have some requirement for reliable energy. The Army needs to develop quantifiable goals for infrastructure based on the mission supported for a broad range of missions. Energy reliability standards will help justify proposed infrastructure improvements.

- c. Identify Critical Facilities. Develop a methodology to identify critical facilities in support of the Defense Critical Infrastructure Program. Prioritize facility types by mission and determine reliability goals for each installation/facility as appropriate.
- d. Develop a value analysis guide to enable installations to select remedial actions on a cost-effective basis. Methodology would include a cost estimating tool to help installations estimate costs for implementing remedial actions.
- e. Trained personnel identify critical assets and analyze vulnerabilities.
- f. Review and update energy security remedial action plans at least annually. Some potential remedial actions may be:secondary feeds from local utility companies; additional on-site generation (power and/or chilled water); redundant paths in the distribution system; diversity of source energy; fuels storage facilities; physical security and hardening measures for existing utilities infrastructure and associated facilities; modification of mission equipment to reduce infrastructure requirements.
- g. Conduct utility interruption tests to determine effectiveness of energy security plans.

5.1.5 Funding Strategies and Sources

Development of the survey methodology, reliability requirements and a facility prioritization methodology would be centrally funded. Updating of energy security plans and water vulnerability assessment and response plans is included in installations’ operation and maintenance budget.

5.1.6 Description of End State

Consistent understanding of installation level vulnerability/risk baselines, reliability requirements and priorities across installations, MACOMs, regions, subcommands and HQDA.

5.1.7 Metrics of Success

- a. Survey methodology developed and disseminated
 - b. Reliability requirements established
 - c. Establishment of facility criticality prioritization based on mission
 - d. Annual assurance that energy security and water vulnerability assessment and response plans are current.
- Assurance statement will be included in the Internal Control Checklist to be incorporated into the latest rewrite of the consolidated Army Regulation on utilities and energy.

5.1.8 Milestones (actions by FY)

Survey methodology developed	FY 2007
Reliability requirements established	FY 2007
Facility criticality identification and prioritization methodology	FY 2007
Annual validation of updated energy security plans and water vulnerability assessment and response plans	FY 2008

Initiative #5: Improve the security and reliability of our energy and water systems in order to provide dependable utility service.

5.2 Action #2: Implement energy security plans and continuously improve the Army Energy Security Program.

5.2.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Estimate local costs of implementing remedial action requirements (M)
- b. Regions and MACOMs compile and prioritize installation requirements (M)
- c. Command review of plans for quality and completeness (S)
- d. Submit remediation cost requirements into budget (M)
- e. Local execution of energy security projects (L)
- f. Incorporate energy security considerations into the design process (M)
- g. Conduct an annual review on the energy security program and disseminate results to field (M)
- h. Better equip energy experts at installations to produce quality probabilistic risk analyses (M)

5.2.2 Technologies and Tools Required

- a. Project cost estimating tools such as the Micro Computer Aided Cost Estimating System (MCACES) developed by the Corps of Engineers and the Energy Security Cost Estimating and Planning (ESCEP) tool developed by Oak Ridge National Laboratory
- b. DD Form 1391 Processor System
- c. Parametric Cost Estimating System (PACES) cost models for vertical construction used for program/budget estimates in the 1391 process
- d. Remedial Action Cost Engineering and Requirements (RACER) for environmental, ordnance and demolition program estimates
- e. Building Life-cycle Costing (BLCC) program developed by the National Institute for Standards and Technology for conducting life-cycle cost analysis for construction projects
- f. Vulnerability Assessment Guide for assisting installation energy experts in preparing and/or reviewing probabilistic risk analyses

5.2.3 Policies, Management, and Institutional Issues

- a. Prioritize funding based on mission objectives and threat level requirements
- b. Assess tenants' share of cost for mitigating vulnerabilities
- c. Apply new technologies to improve reliability and strength of energy systems, storage tanks and distribution lines
- d. Staff must be available to interact effectively with designers/contractors to ensure that all energy security issues are adequately addressed
- e. Institute accountability into the energy security planning process
- f. Diversify energy requirements through increased use of distributed generation and renewable energy

5.2.4 Specific Projects to Meet Action

- a. Incorporate a measure of apparent energy security into the ISR, based on the survey and rating methodology described in Action #1 of this Initiative
- b. Develop prioritized implementation schedules
- c. Compile historic cost data related to recent similar energy security projects
- d. Develop a Vulnerability Assessment Guide to assist installation energy experts prepare/review probabilistic risk analyses either with or without the assistance of consultants
- e. Develop a comprehensive guide for planning and managing the implementation of remedial actions
- f. Conduct command reviews of installation execution of energy security plans
- g. Incorporate energy security considerations into utilities contracts and actions to privatize utility systems
- h. Meet with utility suppliers and privatized utility service providers at least annually to discuss energy security and reliability considerations of installation utility systems

5.2.5 Funding Strategies and Sources

- a. AT/FP funding
- b. Potential for energy security improvements bundled with ESPC or UESC funded projects
- c. Enhanced use lease authority appropriate for local power generating facilities
- d. Budget for energy security improvements through O&M and MILCON funds
- e. Research program grants to study technical issues such as renewable energy technologies that improve energy security and reliability

5.2.6 Description of End State

Installations have secure, reliable energy and water supplies.

5.2.7 Metrics of Success

- Execution rate of funded energy security projects
- Effectiveness of implemented energy security measures
- Rating of apparent energy security based on vulnerability analyses

5.2.8 Milestones (actions by FY)

Identify cost requirements for energy security remediation projects	FY 2009
Command review of installation implementation of energy security program at 20% of installations annually	FY 2009
Incorporate energy security rating into ISR	FY 2010

Initiative #5: Improve the security and reliability of our energy and water systems in order to provide dependable utility service.

5.3 Action #3: Use current and projected energy sources with greatest potential for availability and economy

5.3.1 Approaches to Meet Actions and Priorities (S, M, L)

- a. Participate with other Defense and Federal agencies and academia in forums to assess energy supply trends in order to use technologies using abundant energy sources (S)
- b. Partner with DOE and other Services to develop a facility energy source evaluation and implementation strategy to allow continuous application of the most secure and reliable energy sources at each facility (M)
- c. Establish process to survey, test, evaluate and implement technologies (M)

5.3.2 Technologies and Tools Required

Accurate projections of energy supplies and energy commodity costs

5.3.3 Policies, Management, and Institutional Issues

- a. Current source selection is based on convenience to existing fuel supply and distribution systems.
- b. EPAct 2005 directs increased use of distributed generation and renewable photovoltaic power.

5.3.4 Specific Projects to Meet Action

- a. Develop an evaluation/analysis methodology to assess current and projected energy availability and cost trends in order to assist installations to select the most secure, reliable and cost-effective energy source to match their regional constraints and opportunities.
- b. Incorporate recommended energy source selection criteria into design guidance.

5.3.5 Funding Strategies and Sources

Central funds executed at HQDA level to oversee and participate in development of energy cost and availability projections and energy source selection criteria.

5.3.6 Description of End State

A flexible, continuous energy supply evaluation process in use to identify and use the most appropriate energy supplies for each installation

5.3.7 Metrics of Success

- a. Frequency of disrupted operations at mission critical facilities due to lack of energy supplies.
- b. Amount of budget shortfall averted by using energy sources not impacted by fuel shortages and supply disruptions.

5.3.8 Milestones (actions by FY)

Develop method for using energy supply and cost projections to determine recommended building energy source selection	FY 2007
Periodic update energy source selection criteria to promote secure energy sources	FY 2008 and every five years



Tab Number 7

Acronymns

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Acronyms

AAFES	Army and Air Force Exchange Service
ACSIM	Assistant Chief of Staff for Installation Management
AEWRS	Army Energy and Water Reporting System
AFCESA	Air Force Civil Engineering Support Activity
ASHRAE	American Society of Heating Refrigeration and Air-Conditioning Engineers
BLCC	building life-cycle cost
BPA	Bonneville Power Administration
CBECS	commercial buildings energy consumption survey
CCx	continuous commissioning
CEM	certified energy manager
CONUS	continental United States
DA	Department of the Army
DESC	Defense Energy Support Center
DOD	Department of Defense
DODI	DOD Instruction
DOE	Department of Energy
DPW	Directorate of Public Works
EACA	Energy Awareness and Conservation Assessments
ECIP	Energy Conservation Investment Program
ECM	energy conservation measure
EEAP	Energy Engineering Analysis Program
EMCS	energy monitoring and control system
EPA	Environmental Protection Agency
EPAct	Energy Policy Act
EPR	energy performance requirements

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ESPC	energy savings performance contracting
EUI	energy use index
EUL	enhanced use lease
FEDS	Federal Energy Decision Screening
FEMP	Federal Energy Management Program
FRESA	Federal Renewable Energy Screening Assistant
FY	fiscal year
GSA	General Services Administration
GSHP	ground source heat pumps
HQDA	Headquarters, Department of the Army
HQEIS	Headquarters Executive Information System
IDIQ	indefinite delivery, indefinite quantity
IFS	Integrated Facility System
IMA	Installation Management Agency
IPP	independent power producers
KBtu	thousand British thermal unit
LEED	leadership in energy and environmental design
MACOM	major Army Command
MDEP	management decision package
MILCON	military construction
NIST	National Institute for Standards and Technology
OSD	Office of the Secretary of Defense
POM	program objective memorandum
REC	renewable energy certificate
REEP	Renewable Energy and Efficiency Program
REM	resource efficiency manager
SGO	Standard Garrison Organization

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SIR	savings to investment ratio
SPiRiT	sustainable project rating tool
UESC	utilities energy services contract
UFGS	uniform facility guide specifications
UMCS	utility monitoring and control systems
USACE	U.S. Army Corps of Engineers
WAPA	Western Area Power Administration

Army Energy and Water Campaign Plan for Installations

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Introduction

Initiative 1

Eliminate Energy Waste
In Existing Facilities

Initiative 2

Increase Energy Efficiency In New
Construction and Renovation

Initiative 3

Reduce Dependence on Fossil Fuels

Initiative 4

Conserve Water Resources

Initiative 5

Improve Energy Security

Acronyms

